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# Evaluation of Improved Chulhas in Rural Areas : A Case Study of Uttar Pradesh

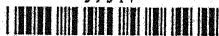
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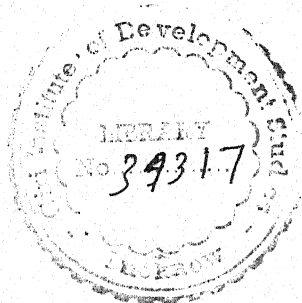
EVALUATION OF IMPROVED CHULHAS IN RURAL AREAS : A  
CASE STUDY OF UTTAR PRADESH

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## PREFACE

The present evaluation study of Improved Chulha programme is prepared at the instance of Department of Non-Conventional Energy Sources, Ministry of Energy, Government of India. The study was made possible by a grant given by the Department of Non-Conventional Energy Sources. We are grateful to concerning Departments of U.P. Government and voluntary organizations for their cooperation at the time of Data collection. We record thanks to Shri C.S. Garia, Shri Rajesh Jauhari, Shri R.K. Singh, Shri Mahavir Singh, Shri M.M. Gupta and Shri A. K. Tewari who were fully responsible for data collection, investigation, coding and tabulation work.

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## CHAPTER I

### INTRODUCTION

#### Background of the problem:

The role of energy for economic development, technological innovations, scientific inventions and welfare of human beings is very significant. Energy is a critical aspect of the national development process and it is consumed by the key sectors, viz, household, industry, transport, agriculture and construction. The energy crisis has attracted the attention of development planners, technologists, scientists and others to look for new sources of energy as well as to conserve the existing sources of energy by rational and efficient use. The Third World countries present a picture of vast diversity not only in terms of such basic features as size of population, resources, level of poverty and unemployment, stage of economic development and political systems of government, but the diversity extends also in respect of several aspects of energy sources and demand. In developing countries, most of their population lives in rural areas and there are marked differences in patterns of energy consumption, between rural and urban areas. In



India about 76 per cent population lives in villages and consumes energy in a significantly different manner than its urban counterpart. The most important fact about energy consumption in rural areas is that a major part of the energy consumed comes from non-organised sources and consumption of energy is dominated by domestic sectors. The main energy requirement of rural population is for cooking which accounts for about 90 per cent of their total energy requirements. Wood, agricultural waste and animal dung are mainly being used as fuel in a rural kitchen. The rural cooking appliances and end-use devices which are being commonly used in rural houses have very low value of thermal efficiencies. The energy consuming activities that convert fuels to heat and useful work are frequently accompanied by undesirable as well as unhealthy side effects. The search for new sources of energy and adoption of energy conservation measures in all energy consuming sectors are essential to meet the energy crisis because the sources of existing energy supplies are limited. Efficient energy use and proper conservation of existing energy sources, particularly for rural areas, require efficient management from supply side and well-trained consumer from demand side, which ultimately highlights the need for awareness about the energy problem and pattern of energy use.



The household sector is the largest consumer of energy accounting for about 50 per cent of the total energy consumption in the country. Energy is used in household essentially for cooking and lighting and a bulk of energy consumption is for cooking. At present about 150 million cooking fires are lit at least twice a day in our country and approximately 90 per cent of the households use fuelwood and agricultural waste as fuel for cooking at a consumption rate of about 200 million tonnes per year. According to "fuelwood Study Committee" of Planning Commission (March 1982), in household sector 83.5 per cent population in rural areas and 64 per cent population in urban areas still consume solid fuel. With the increase in population, exploitation of the unevenly distributed natural resources has also increased exorbitantly. All the human beings depend upon nature for the fulfilment of their basic requirements, as a result, nature is being exploited rapidly and indiscriminately. Although the confrontation and violence between man and nature is world wide but the situation in the third world countries (including India) is worse. Due to this exploitation all the natural resources like water, minerals, soils and air, which are the basic components of life, are diminishing gradually. The fuel wood committee has estimated that the annual demand for wood is 133 million tonnes while the annual increment of wood is not more than 30 million tonnes.

During the 12th congress of the World Energy Conference held in New Delhi in September 1983, the secretary, Department of Environment attracted the attention of the congress towards the crisis of fuel in India and other countries. He pointed out that the oil scarcity in the poor countries is not as such magnitude as the crisis of domestic fuel and firewood. He warned that if the situation remains unchanged, then the 2000 AD, 25 crore households will be unable to cook their food.

The "energy crisis" has led an increased awareness of the need to conserve energy. The real meaning and implications of energy conservation are still not widely understood. Conservation in its broadest sense, really means that we reduce the rate at which we consume energy and generate waste heat. Towards this end, three broad strategies are needed:

- (i) a change in our habits of energy consumption to reduce irrational need for energy;
- (ii) an increase in the efficiency at which we obtain 'available work' from our technologies (end-use devices) and life support system by improving efficiency in energy use; and
- (iii) increase in the use of renewable energy systems.

The source of fuelwood extends progressively from collecting deadwood to the lopping of trees, the felling

of trees, and the destruction of tree cover and eventually to the uprooting of stumps and the removal of shrubs. Subsequently there is diversion of agricultural residues and animal dung to fuel use causing detriment of soil structure and fertility. The most wide spread traditional cooking method in rural areas is open fire on traditional chulhas, in which only 2 - 10 per cent of the potential energy of the fuel is utilized. The open hearth method entails considerable heat loss and only a small fraction of the available heat energy becomes available for the actual process of cooking. The smoke emitted is a serious health hazards particularly for the housewives who usually remain indoors. There are serious economic and environmental losses associated with the traditional pattern of the use of wood, crop residue and cattle dung as fuel.

The department of Non-Conventional Energy Sources took up the "Improved Chulha Programme" as a National Project in right earnest in December 1983, when it was realized that woodstoves which were the main cooking appliance in over 112 million rural households all over the country were consuming over 133 million tonnes of scarce fire wood with only 2 to 10 per cent efficiency output. The project is designed as a programme for women for mitigating their drudgery and health hazards and also save fuel in the bargain. Different

types of cookstoves have been designed according to needs, cooking habits and fuel consumption and various designs of improved cookstoves have been approved by the Department having efficiency about 20 per cent. Under the project, which has a multi-model and multi-agency approach, several models of improved cookstoves, both fixed and portable types, which have been approved by the Department, are being demonstrated and installed all over the country. The project is entirely funded and subsidized by the Department. Central subsidy has been provided according to regional differences and various beneficiary groups, ranging from full cost of material in the fixed models of cookstoves to 50-75% of cost in portable models. Voluntary organisations and women organisations have been involved in the implementation of the programme from the very beginning so that the project may have committed involvement of all who can contribute to its success.

The introduction of new design of chulha has wider implications with respect to the health and safety of the housewives. The Department of Non-Conventional Energy Sources has introduced single pot, two pot, three pot and multipot chulhas as a device to conserve and use the cooking fuel more efficiently. Introduction of improved chulha is expected to fulfil two important needs (1)



reduction in fuelwood demand for cooking by seeking cooking efficiency improvement; and (ii) improvement in the cooking process and environment by providing mechanisms for central fire intensity, and in many cases, smokeless operation.

Scope and Objective:

The evaluation study was undertaken with the objective of assessing the performance and impact of Improved Chulha on users and their perception towards the programme. The study seeks to analyse the socio-economic background of the beneficiaries (users) in terms of caste, family composition, education, land holding and their housing structure.

An attempt is made to review the National Programme on improved cookstoves by examining the awareness about the programme among the users, their willingness, attitudes towards the programme and time as well as energy saving achieved in the cooking process through improved chulhas. Problems related to installation, operation, maintenance and durability of improved cookstoves are also discussed. The study also highlighted the views, awareness and participation of the households who are using traditional chulha regarding improved chulhas. The time spent on cooking process as well as in collecting fuel for cooking by the users of traditional chulhas is also examined.

Sample size and coverage of study:

To evaluate the impact of improved chulha programme and consumers perception regarding its performance in the rural areas of Uttar Pradesh, the survey was carried out in the Central and Eastern regions of the state. For this purpose two districts viz., Lucknow and Barabanki of Central region and two districts viz., Ghazipur and Azamgarh of Eastern region were chosen for field survey. The selection of sample districts was done on the basis of installation of maximum number of improved chulhas. From each of the selected districts, three villages were selected on the basis of concentration of maximum number of installed improved chulhas on the one hand and location of the villages on the other. The survey was to be carried out in the households having improved cookstoves as well as household using traditional chulhas so that a comparative analysis could be made. Therefore, from each selected village 86 households (68 households using improved chulhas and 18 households with traditional chulhas) were surveyed and detailed information was collected through a structured questionnaire prepared for this purpose. In all, 12 villages were selected from the selected districts for detailed investigation. The selection of households had been made by considering the criteria of land holding size of

households and their respective social groups. Detailed investigation for data collection for the study was undertaken among a sample of 1032 households (816 improved chulhas and 216 traditional) from different sample villages of the Central and Eastern regions of Uttar Pradesh. The sample households were identified randomly from the selected villages. The selected districts and villages are listed below; along with number of sample households.

Data on socio-economic background, i.e., social group, family composition, education, occupation, economic status, land holding, housing structure, provision of sanitation in the houses, facilities like drinking water and electricity, were collected. Information about the improved chulha, type of chulha, time of installation, type of fuel required, motivation to instal the improved chulha, performance of chulha were also analysed. The views of users regarding the advantages of improved chulhas interms of fuel and time saving in cooking process as well as collection of fuelwood, elimination of smoke and cleanness of utensils and environment were collected. Nature of changes if changes made in the improved chulha and reasons and extent of these changes were examined. The general practices adopted by the users of improved chulhas when any problem develops in the chulha were also studied. The problems related to installation,



Table (i) : Villages and Number of Sample Households Covered in Survey of Selected Districts.

Region/District	Selected villages	No. of total households in sample villages	No. of households having improved chulha	No. of households having proved chulha	Households using additional chulha	Total surveyed	Percentage of households surveyed to the total number of households
<u>1. Central Region:</u>							
(a) Lucknow	1. Gaura 2. Jabrauli 3. Binduwa	1292	778	204	54	258	19.97
(b) Barabanki	1. Sukla 2. Barel 3. Hatundha	1495	912	204	54	258	17.26
(c) Total	6 villages	2787	1690	408	108	516	18.51
<u>2. Eastern Region:</u>							
(a) Ghazipur	1. Sikandarpur 2. Devkale 3. Baberi	664	487	204	54	258	38.86
(b) Azamgarh	1. Manpur 2. Bahadurpur 3. Khirikhota	677	424	204	54	258	38.11
(c) Total	6 villages	1341	911	408	108	516	38.48
3. Both the Regions	12 villages	4128	2601	816	216	1032	25.00

operation and maintenance of improved chulhas have also been examined. The study has highlighted the constraints viz., economic, social, cultural and institutional in the extension of this programme.

At the same time, information regarding willingness to instal and attitude towards improved chulhas were also collected from the households who are using traditional chulhas. Their awareness, knowledge about the advantages of improved chulhas, willingness to instal the improved chulha were also deeply examined. Fuel requirements in traditional chulhas, time spent on collection of fuel as well as in cooking, reasons for not installing improved chulha from the households of traditional chulhas is also studied.

The field survey and detailed investigation was carried out by the members of the research team who had been given practical training in the construction and operation of improved chulhas. The training was imparted to them in the Department of Rural Development and Appropriate Technology, Indian Institute of Technology, New Delhi, Sponsored by the Department of Non-Conventional Energy Sources, Ministry of Energy, Government of India. During the course of field survey, the members of research team not only collected information from the households

but also propagated the National Programme by constructing the models of improved chulhas and by making the users aware of its benefits and by giving instructions about the proper use and maintenance of the improved chulhas. The field survey in the selected villages was conducted during March-May 1987.

In Uttar Pradesh, the responsibility of implementing the National Programme on improved chulha has been taken by State Government and the Department of Non-Conventional Energy Development Agency. The State Government is implementing the programme in different areas through various agencies, such as Extension Training Centres, Farmers' Training Centres, D.W.C.R.A. and other voluntary organisations.

In rural areas, Smokeless Improved Chulha Training Camp is organised and 20-25 trainees are given training about the construction of Improved Chulha by a Master trainer. During the training course, the trainees are given instructions about the proper use of chulha as well as the advantage of the improved chulha. The aim of the training is to propagate the programme and to make people aware about the improved chulha. The training camp is generally organised for 10 days and it is expected from each trainee that he/she would construct and instal

atleast 10 improved<sup>chulhas</sup>/in villages after the training. The mechanic is given Rs.5.00 per installed chulha and the scheme would also create the self-employment avenues. The trainees have to construct at-least three improved chulhas each during the period of training camp and they are paid an honourarium during training.



## CHAPTER II

### GENERAL CHARACTERISTICS OF THE SAMPLE HOUSEHOLDS

As has already been pointed out 68 households having improved chulhas and 18 households with traditional chulhas have been surveyed in each sample village. The total households in our sample accounted 18.51 per cent of the total households of the selected villages in the central region and 38.48 per cent in Eastern region and over all about 25.00 per cent of the households from all the selected villages have been surveyed. The total population of 1032 sample households in both the regions was 7003, the average family size being 6.78 in aggregate, 5.97 in Lucknow, 6.10 in Barabanki, 7.96 in Azamgarh and 7.11 in Ghazipur (Table-2.1). The average family size was found substantially higher in Eastern region (7.54) as compared to Central region (6.05). Variation has not been found in the average number of family members in the households having improved chulha and the households using traditional chulhas.

The sample was taken from each of the social groups in the selected villages. The composition of social groups in the sample households having improved chulha shows that in the total sample, the households from general caste were 25.98 per cent and the SC/ST were 38.48 per cent, while backward caste and Muslim constituted 25.86 per cent and 9.68 per cent respectively. Similarly, the composition of social groups in the sample households using traditional chulhas shows that the respective share of general caste, SC/ST, backward caste and Muslim was 26.39 per cent, 41.67 per cent, 28.24 per cent and 3.70 per cent (Table-2.2). When we look at regionwise social classification of sample households having improved chulhas, we find that the percentage share of general caste in the sample was relatively higher (35.77%) in Eastern region as compared to Central region (15.20%), but at the same time, the ratio of SC/ST and Backward caste was lower in the Eastern region. Similarly in the case of sample households using traditional chulhas, the percentage of general caste was substantially higher in Eastern region as compared to Centre region, while the share of SC/ST, backward caste and Muslim was lower in the region as compared to Centre region. There was also variation in the respective shares of social groups in the sample districts.

The educational level among the head of households indicated that over 43 per cent were illiterate and the education of 21.22 per cent of head of the households was upto primary level. The head of household constituted about 31 per cent whose education was between primary level and Intermediate standard. The educational level of only 4.75 per cent head of families was graduate or above. The educational level of head of the households varied from one district to another.

Taking all the sample households together the occupational pattern of head of households indicated that 58.04 per cent of them were engaged in agriculture (either cultivators or agricultural labourers) and 18.90 per cent head of households reported that they were serving either in formal sector or informal sector (Table-2.3). Business has been as an activity for 9.78 per cent heads and the head of 13.28 per cent sample households were earning their livelihood from other non-agricultural sources. The occupational pattern among the head of households in the individual sample districts was not in similar order. The family background and the demographic structure of the total sample households (both with improved chulhas and traditional chulhas) in both the regions reveals that the sex ratio (number of females as per 1000 males) was 867 in



aggregate, which varied from 785 in Barabanki to 914 in Azamgarh (Table-2.4). The sex ratio was substantially higher in Eastern region (906) as compared to Central region (821). As far as economic status of the family members in the sample household is concerned, it is found that the proportion of persons engaged in any productive activity recorded as 26.54 per cent in district Lucknow, 27.83 per cent in Barabanki, 21.56 per cent in Azamgarh and 21.15 per cent in Ghazipur, over all proportion being 23.96 per cent. Within the regions, the proportion of earning members in the households was considerably higher in central region (27.19%) as compared to Eastern region (21.37%). In absolute term, on an average, the ratio of earning members was 1.63 in a average family size of 6.79 persons (Table-2.4). The school going members in sample households constituted about 68.87 per cent in the total population of school going age. The school going children recorded a larger proportion in the sample households of Eastern region (81.36%) as compared to Central region (53.42%). Similarly, the proportion of illiterate persons was considerably higher at 51.07 per cent in Central region while this figure was 32.38 per cent in Eastern region. Among the sample districts the proportion of illiterate persons varied from 25.35 per cent in Ghazipur to 52.69 per cent in Barabanki. The higher proportion of school

going children and lesser proportion of illiteracy among the population of sample households in Eastern region indicates that the educational institutions are near and approachable to the sample villages in the region.

The distribution of sample households according to land holding size indicated that in the households having improved chulha, 21.53 per cent were landless, 43.98 per cent households in the sample had land holding upto 2 acres. Those who had land holding size 2.01 to 5.00 acres, constituted 24.39 per cent in the sample and households having more than 5 acres of land had represented 10.10 per cent sample. Similarly, among the sample households of traditional chulha, 22.21 per cent households were landless, 46.51 per cent had land holding upto 2 acres, 23.71 per cent had landholding size between 2.01 to 5.00 acres and 7.57 per cent households were holding more than 5.00 acres of land. Selection of households were made according to the proportion of households in the different sizes of land holdings.

Data pertaining to housing structure of the sample households indicates that only 30.27 per cent households with improved Chulhas had pucca houses while 26.39 per cent households having traditional chulhas had pucca houses. Higher percentage of households had pucca houses in the

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sample villages in Eastern region as compared to the Central region. Among the sample districts the percentage of households who had pucca houses varied from 14.71 in Lucknow to 39.71 in Ghazipur (Table-2.5). The comparison between households having improved chulhas and households using traditional chulhas revealed that the households using traditional chulhas had relatively higher percentage of kuchha houses as compared to households using improved chulhas. As far as the provision of separate kitchen in the sample households is concerned, it has been seen that very few households had a separate kitchen in their houses, accounting for only 9.79 per cent in aggregate. The households in Eastern region had a slightly higher percentage of houses with separate kitchen as compared to Central region. When we look at the provision of separate kitchen in the houses having improved chulhas and those having traditional chulhas, it is found that the households with improved chulhas had separate kitchen in a higher percentage cases as compared to households using traditional chulhas (Table 2.5).

The provision of other facilities like, electricity, bathroom and latrine in the houses of sample households indicates that limited number of households had such

facilities. Though there was a provision of electricity in the 4 villages out of 12 sample villages, only 1.84 per cent of the sample households were electrified. Individual districts have shown a variation in this regard. The provision of electricity in the sample households was relatively at a higher proportion in Central region as compared to Eastern region. The households which had provision of bathroom and latrine in their houses accounted 2.91 per cent and 3.00 per cent respectively (Table-2.6). The proportion of households which had bathroom and latrine in their houses was found relatively higher in the households having improved chulha as compared to the households using traditional chulhas. As far as availability of accommodation in the houses is concerned, on an average a family was sharing 2.75 rooms in the sample households. More than 40.00 per cent of the households reported inadequacy of accommodation in their houses.



### CHAPTER III

#### ANALYSIS OF THE IMPACT AND PERFORMANCE OF IMPROVED CHULHA

##### Installation of Improved Chulhas in the Sample Households:

It has been found that, fixed type of improved chulhas have been installed in the sample households of selected districts in both the regions. The NADA model of improved chulha is most popular and all the chulhas were found to be two-pot type. Data regarding the fuel consumption in the improved chulhas indicated that fuelwood, dung cakes and crop residues were generally being used by the users in all the sample districts. However, a little variation had been observed in the proportion of different kinds of cooking fuel in the individual districts. On the basis of data collected from the villages regarding the source of fuel for cooking purpose, it is found that the wood, dungcakes, crop residues, kerosene oil, gobar gas, coal, saw dust and L.P.G. are used by the households in the sample villages. However, the proportion of coal, kerosene oil,

saw dust and L.P.G. seems very nominal in total fuel consumption. Generally, the percentage shares of fuelwood, dung-cakes and agricultural waste are about 35.00 per cent, 36.00 per cent and 17.00 per cent respectively in the total fuel consumption.

Data pertaining to the period of installation of improved chulha in the sample households indicated that 16.91 per cent chulhas were installed during 1985. The improved chulhas which had been installed in the sample households during 1986 constituted 76.84 per cent, and remaining 6.25 per cent improved chulhas had been installed in 1987 (upto March).

The installation work of improved chulhas in the sample households was done by four different agencies, viz. Non-conventional Energy Development Agency (NEDA), Extension Training Centre (ETC), Chandra Bhanu Rural Development Agency (CBRDA), and the Labour Organization of Rural Poor (LORP). The first two are government and semi-government agencies and remaining are voluntary organizations which are directly involved in the National Programme on Improved Chulha. These voluntary organizations are funded by the Government. Taking all the sample households together, it is observed that 41.67 per cent improved chulhas had been installed by NEDA, 25 per cent by LORP, 25.00 per cent by ETC and 8.33 per cent by CBRDA (Table 3.1). In the Central region, all the

improved chulhas had been installed by NEDA (83.33%) and CBRDA (16.67%) alone. In the Eastern region, 50.00 per cent of the improved chulhas in the sample households had been installed by LORP and remaining 50.00 per cent by Extension Training Centres. Overall, 66.67 per cent improved chulhas had been installed by Government agencies directly and 33.33 per cent by Voluntary Organisations. In the villages of Eastern region, we did not have any household in our sample, where NEDA had installed improved chulha. Here, it would be appropriate to mention, that the selection of villages had been made in such a way so that the performance of improved chulhas installed by different agencies could be evaluated.

Let us examine the sources of first hand information to the users about the programme of improved chulha. To know the source of first hand information to the households about the National Programme seems an essential task to consider the effective media for the extension of the programme in the countryside in future. The users of improved chulhas had been asked the source of first hand information about the programme. Data pertaining to this information revealed that the Government officials and voluntary organisation were the main sources of first hand information about the programme to users as reported by



43.14 per cent and 36.40 per cent users, respectively (Table-3.2). The next important source was village Pradhan through whom 12.37 users came to know about the programme. The contribution of newspaper, radio and T.V. in this context has been only nominal. The individual sample districts have shown a wide variation as far as the source of first hand information is concern. Newspaper as a source of first hand information had been in a limited households and was confined to one district (Azamgarh). Government officials had been as a source of first hand information for about 40.10 per cent households using improved chulhas in Central region as against 46.08 per cent in Eastern region. The role of voluntary organisations had been much more in the sample villages of Eastern region. In the Central region, the village Pradhans had been a source of first hand information in a number of cases.

During the survey, it was observed that motivation has played a significant role for installing improved chulhas in rural areas. In the absense of proper media of publicity for making people aware about the programme, proper motivation played a considerable role in the participation of households in the programme. It has been

recorded that village Pradhan had played a key role in the programme by motivating the households for installing the improved chulhas in 48.90 per cent cases, taking all the sample households together. The second source was the Government official who motivated 27.82 per cent households to instal the improved chulha (Table-3.3), while the Voluntary Organisations had motivated 19.85 per cent households. When we analyse the data regarding the motivation in accordance with individual regions, we find that there has been variation in the role of different sources for motivation. In Central region, Village Pradhans had motivated about 90 per cent users while in Eastern region, only 7.84 per cent users had been motivated by the Pradhans. In the sample villages of Eastern region, Government officials had motivated to 48.77 per cent users while in Central region 6.86 per cent cases had been motivated. Government officials such as, B.D.O., A.D.O. Extension Training Officials were the main functioneries who had motivated the households.

Working condition of Improved Chulhas:

Data pertaining to the working condition of the improved chulhas in the sample households revealed that out of 816 improved chulhas, only 52.94 per cent were

found in working condition. When we look on the regionwise data about the working conditions of the improved chulhas it is found that in Eastern region higher percentages of improved chulhas were in working order as compared to Central region. In the sample households of Eastern region, 64.71 per cent improved chulhas were found in operation while in Central region this figure was 41.18 per cent. As we have mentioned earlier that 83.33 per cent improved chulhas in the sample households had been installed by NEDA in Central region. The working condition of improved chulhas in the individual districts indicated that 37.25 per cent in Lucknow, 45.10 per cent in Barabanki, 55.88 per cent in Azamgarh and 73.59 per cent in Ghazipur the improved chulhas were perfectly working (Table-3.4).

It has been observed that due to lack of proper guidance about the operation of improved chulhas among the users and some kinds of inbuilt technical defects in the chulhas, changes had been made in the chulhas by the users immediately after its installation. Taking all the sample households (Where improved chulhas have been installed) together, it is found that changes had been made in the case of 45.83 per cent chulhas and among them 90.11 per cent were properly working. On

the other hand, when we examine the improved chulhas without any change, it is found that only 21.49 per cent were in working order. Regionwise figures in this regard revealed that changes had been made by the users in a higher proportion of chulhas in Central region (50.25%) as compared to Eastern region (41.42%). Similarly, variation has been recorded in the number of users who had made changes in their chulhas in the individual sample districts and it recorded 49.01 per cent in Lucknow, 51.47 per cent in Barabanki, 52.45 per cent in Azamgarh and 30.39 per cent in Ghazipur (Table-3.4). In the case of households in Eastern region 39.75 per cent chulhas were in working condition among those in which changes had <sup>not</sup> been made. All the improved chulhas in which changes had been made were working in Eastern region while in Central region merely 18.05 per cent chulhas were working even after same changes made.

The working pattern of improved chulhas in the sample households indicated that a higher proportions of chulhas which were not working were found among the households of SC/ST, Backward Caste and Muslim as reported by the households of 53.50 per cent SC/ST, 42.62 per cent Backward caste and 62.02 per cent Muslim (Table-3.5). In both



the regions, the percentage of chulhas which were not working or not being used was relatively higher in the households of these social groups as compared to the general caste where 36.32 per cent households reported that the installed chulhas were not working. It simply highlights that households from some of the social groups did not follow the necessary guidelines about their operation or these households had been indifferent regarding the programme and similarly as soon as any problem arose they started cooking on their traditional chulhas.

#### Performance of Improved Chulhas installed in different years

The comparative analysis of data regarding the performance of improved chulhas installed in the sample households in different years recorded a significant variation in the proportion of working chulhas installed in different years and it has been seen that the improved chulhas which had been installed recently were found working at a higher proportion than the chulhas installed one or two years ago. The working pattern of improved chulhas installed during different years revealed that 82.35 per cent chulhas were found perfectly working among the chulhas which had been installed during the year 1987 (upto March). The survey of the research project was conducted during the last week of March 1987 to May 1987. The proportions of working chulhas which had been installed during 1986 and 1985 were 54.23 per cent and 36.23 per cent respectively (Table 3.5 (A)). The percentage of working

chulhas has shown an increasing trend year by year. Similar pattern has been observed in the proportion of working chulhas when the performance of improved chulhas installed in different years are examined in the individual sample districts (Table 3.5 (B) ). However, among the individual districts a little variation has been recorded in the proportions of working chulhas installed during different years. Among improved chulhas installed during the year 1987, the proportion of working chulhas was highest at 86.50 per cent in district Ghazipur followed by 80.00 per cent in Azamgarh, 75.00 per cent in Barabanki and 60.00 per cent in Lucknow, where as this figure was 58.33 per cent in district Ghazipur, 39.13 per cent in Azamgarh, 35.71 per cent in Barabanki and 30.30 per cent in district Lucknow for the year 1985 (Table 3.5 (B) ). The percentage of working chulhas in the sample households had been relatively higher in the chulhas installed during 1986 as compared to chulhas installed during 1985. The comparative analysis of data pertaining to the proportion of working chulhas installed in 1985 and 1987 indicated that the variation in the proportion of working chulhas installed during 1985 was not as wide as it was recorded in the improved chulhas installed during 1987 (Table 3.5 (B) ). The year wise performance of improved chulhas in the sample households indicated that the proportion of improved chulhas which were found in working condition had been at a higher rate in the villages of Eastern region as compared to the Central region from the beginning of the programme.



It has also been observed that the tendency to make alterations the improved chulhas has decreased among the sample households in due course of time. The proportion of chulhas in which changes had been made was relatively lower among the chulhas installed during the year 1987 as compared to the chulhas installed during 1985 as well as 1986. Taking all the sample chulhas together, there has been changes in the 63.77 per cent improved chulhas installed during 1985, where as this figure was 27.45 per cent in the case of chulhas installed in the households during the year 1987 ( Table 3.5 (A) ).

The foregoing analysis highlighted that the national programme on improved chulha is getting wider publicity in the rural areas from year to year and the improved chulhas are working at a higher efficiency. The encouraging trend in the performance of improved chulhas in the sample households indicates that the users are coming closer to the programme and also becoming more aware about the advantages of the improved chulha. Similarly, the installing agencies are showing greater responsibility in installing chulhas in a better way. The participation of users and the involvement of installing agencies in the programme is increasing year to year.

When the performance of improved chulhas installed by different agencies are examined it is found that 64.11 per cent of the chulhas installed by NEDA, 32.33 per cent by CBRDA, 19.61 per cent by LORP and 50.98 per cent by ETC were either not working or not being used by the users due to either technical defects or operational problems. Over all, the performance of improved chulhas installed by voluntary organizations was found considerably better as compared to the improved chulhas installed by government agencies. About 59.19 per cent of the chulhas installed by government agencies were not in working order whereas 22.79 per cent of the chulhas constructed by voluntary organizations were not working. (Table 3.6). As we have seen earlier than 47.06 per

cent households had reported that improved chulhas in their houses were not working. Data regarding the reasons for chulha not working had been collected from the sample households. Various reasons had been reported by the users of sample households. Among them, high fuel consumption by improved chulhas was the main reason reported by 65.37 per cent of the households (where the chulhas are not working) (Table-3.6). Similarly high consumption of fuel by improved chulhas had been reported by maximum number of households as one of the reasons for not working their chulhas irrespective of installing agencies in both the regions. In this context, it is observed that there has been mainly two reasons for reporting the high rate of fuel consumption by the improved chulhas in sample households. The first and foremost reason was that in most of the cases, the users had no knowledge about the handling of chulhas as well as they had not been given proper instructions at the time of installation. The second reason, which led to high fuel consumption in the improved chulhas, was that these chulhas had technical defects. The door to door investigation revealed that in some chulhas either the fire box was not in accordance with the size of chulha, or pot-holes were not in proper shape, or the baffle was not appropriate or dampers were

removed. The front damper was seen absent in most of the cases even in the chulhas which were being used by the households. It is obvious that in the absence of essential preconditions, the fuel consumption would be much more. On account of not compatible 29.17 per cent households were not using improved chulhas. In addition to other reasons 23.18 per cent households were not using their improved chulhas simply because of smoke could not be eliminated. This has happened due to lack of proper combination of all the operational norms. Some of the households reported that in the beginning the chulhas were functioning properly, in due course of time, these chulhas became out of order due to operational defects and this had also been one of the reasons for not working the chulhas in 14.06 per cent cases. As we have mentioned that users were not aware about the operational aspects of the chulhas, and repairing problem has also been advanced by some of the households whose chulhas were not working.

At the initial stage, the chimney in the improved chulhas were made of tin and without any cowl and it was reported by villagers that in some kuchha houses the fire broke out. Fear of accident was another reason for not using improved chulhas as reported by 2.86 per cent of the households.

After analysing the data regarding the reasons for not working or not using improved chulhas it is clear that none of the installing agency had given proper instructions to the households where the chulhas had been installed. By giving proper instructions and necessary guidance to the users, a higher number of households would have been using the improved chulha.

When we look on the regionwise figures related to the performance of the improved chulhas in the sample households it is found that the percentage of chulhas which were not working recorded a higher percentage in Central region as compared to Eastern region. In the households of Central region, 58.82 per cent of the installed chulhas were not working while this figure was 32.29 per cent in Eastern region. The individual districts have also shown a variation in this regard. The percentage of improved chulhas which were not working or not being used accounted 62.74 per cent in District Lucknow, 54.90 per cent in Barabanki, 44.12 per cent in Azamgarh and 26.47 per cent in Ghazipur (Table-3.7).

The study revealed that the education of head of households had positive impact on the performance of improved chulhas. We tried to examine the performance of improved chulhas with the level of education among



the head of households (Table-3.8). It was found that the percentage of not working or chulha not in use was considerably higher (51.04%) in the households headed by illiterate persons as compared to the households with an educated head (44.25%). Again this could be evidenced by the fact that the percentage of not working chulhas was 33.33 (which is significantly lower as compared to illiterate head of households) in the households where the education of head of households was graduate and above. The educated head of households might have read the proper instructions about the chulhas either in newspapers or in other literature. The same reasons, which we have noted earlier, were pointed out by the educated head of households for not working or not being used their chulhas (Table-3.8).

Changes made in the Improved Chulha by the users:

As has already been pointed out that out of 816 households (with improved chulhas) surveyed in both the regions, 45.83 per cent households had made major changes in their improved chulhas after the installation. Among these 9.89 per cent were either not being used or not working. Data pertaining to the nature of changes in the improved chulhas indicated that more than one change had been made in each chulha by most of the sample households.

It is revealed that the changes in pot-hole size had been the first alteration made in the chulhas as indicated by 42.25 per cent households (Table-3.9). At the time of installation, the requirement of the pot-hole size in accordance with the size of pot in the household had been neglected by the mechanics who installed the chulhas in most of the cases. In some cases, the households had changed the pot-hole sizes according to their will, even the pot-hole sizes were adequate. It has been seen during investigation that in most of the cases the cooking utensil was not properly fitted on the pot-hole leading to considerable heat loss.

Districtwise figures regarding the changes in the pot-hole size varied from as high as 53.00 per cent in district Lucknow to as low as 30.65 per cent in Ghazipur. The proportion of households who changed pot-hole size in their chulhas was relatively higher in Central region as compared to Eastern region (Table-3.9). The second major changes in the chulhas accounted the removal of dampers and in the case of 35.83 per cent chulhas either the front or the chimney damper or both had been removed by the users. The investigation observed that the proper utilization of damper in the chulhas was known to a limited number of users. The practice of removing the damper has

been at a higher rate among the households of Eastern region as compared to Central region as 51.48 per cent households in Eastern region and 22.92 per cent households in Central region had removed the dampers of their chulhas. The front damper had been removed by majority of households. The removal of dampers had been one of the main reasons for high rate of fuel consumption by these chulhas. Change in the shape of feeding chamber was another change made by the users. About 15.77 per cent households had also changed the shape of feeding chambers with other changes. The size of solid fuel pieces and kind of fuel consumption were the main causes for the changes made in the feeding chambers. In some cases, the fire-box had been changed and also the feeding gate had been widened. In both the cases, there has been disbalance between the size of fire box and the feeding gate (door). Some of the households changed the feeding chamber only for the purpose of cooking CHHAPATIES. Lack of proper combination between feeding chamber and its windown, the head efficiency could not be utilised and ultimately the fuel consumption had shown a increasing trend. Removal of chimney and change in baffle was also reported by some of the households in their chulhas.

When we examined the level of changes in the improved chulhas installed by different agencies, it is found that at a higher rate in chulhas and semi-government the changes had been made/installed by government/agencies than in the chulhas installed by the voluntary organisations. Data in this regard revealed that there had been made changes in 38.97 per cent chulhas installed by the voluntary organisations, whereas alterations had been made in 49.27 per cent chulhas installed by government agencies (Table-3.10). Among the installing agencies, the proportion of such chulha was as high as 54.70 per cent in the case of chulhas installed by N.E.D.A. and as low as 27.94 per cent installed by C.B.R.D.A. The nature of changes did not indicate any significant pattern in the chulha installed by different agencies.

When we analyse the data regarding the changes made in improved chulhas according to the education of head of the households, it was found that the education of head of the households had also shown a positive impact of their education on the performance of the chulhas. Higher proportion of users had made changes in the chulhas in the case of families headed by illiterate members as compared to the households with their educated head. Data revealed that 46.29 per cent households had made changes in their improved chulhas where the families were headed by



illiterate persons while in the case of households with educated head 43.63 per cent users had made changes in their chulhas (Table-3.11). The study highlights that in majority of cases changes had been made due to technical defects in the installation of chulhas. Change in pot-hole size, removal of damper and chimney were the main changes in the improved chulhas in all the cases. The users of improved chulha had not been given direction by the installing agency regarding the clearing of chimney. Consequently, not a single user had reported the cleaning of chimney in their chulhas.

Does the family size of the users have any impact on the practice of making changes? In this context, data had been collected and it was found that the propensity to change in the chulhas was higher in those households where the family size was small. It is found that 49.19% households with less than 3 members, made changes in their chulhas, while 37.67 per cent households had made changes in the chulhas in the case of households having more than 10 members in their families (Table-3.12). The nature of changes in the chulhas did not show any significant trend and the concentration of these changes had been confined to the change in pot-hole size, and removal of dampers and chimney as we have seen in other cases.

Level of Instructions given to the users:

After reviewing the performance of improved chulhas and changes made in them, it will be appropriate to examine the level of instructions given to the users about the proper use of improved chulhas. Data on the level of instructions given to the users indicated that only 59.06 per cent households reported that they had been given instructions about the use of the chulhas. The regionwise figures in this regard revealed that 71.56 per cent of the households in Eastern region and 46.56 per cent of the households in the Central region had reported that they had been given instructions. In the individual districts, as high as 94.11 per cent households in district Ghazipur and as low as 43.13 per cent households in Barabanki reported that some instructions were given to them.

When we look the performance and proportion of actual working chulhas in the households whom the instructions were given about the operation of chulhas as well as in the households without instructions, it is found that the proportion of actual working chulhas was considerably higher in the households which had been given instruction as compared to households without instructions. The percentage of chulhas actually working accounted 63.48 per cent in the households with instruction and 37.72 per cent in the households without instructions (Table-3.13).

Again it has been observed that the proportion of working chulhas was significantly larger in households with instructions as well as households without instructions in the Eastern region as compared to Central region.

When the data on the level of instructions given to the users by different installing agencies are examined, it is found that the instructions had been given by the voluntary organisations to higher percentage of users as compared to government agencies. Taking all the sample together, the data revealed that 63.60 per cent users had been given instructions by the voluntary organisation and 53.12 per cent users were given instructions by government or semi-government agencies (Table-3.14). About 80.39 per cent of the users, among these households where installation of improved chulhas was done by Labour Organisation of Rural Poor (a voluntary organisation), reported that they had been given instruction. The performance of chulhas, after giving instructions to the users by different installing agencies, indicated that 83.93 per cent of improved chulhas were perfectly working at the time of investigation in the case of households where instructions were given by voluntary organisations as against 49.82 per cent chulhas were working in the households where government agencies had given instructions (Table-3.14). Similarly,

the chulhas were found in working order in a higher percentage of households even without any instructions given to the users in the case of chulhas installed by voluntary organisations. The foregoing analysis indicated that the involvement of voluntary organisations in the national programme on improved chulha in rural areas had been found more satisfactory as compared to the participation of government agencies.

The impact of instructions given to the users is also examined in terms of changes made in the improved chulhas by the users of sample households. Data pertaining to the changes made in the chulhas by the users to whom instructions were given revealed that changes had been made relatively in lower proportion of chulhas in the case of instructions given to the users.

Though 59.06 per cent of the users in the total sample of households having improved chulhas reported that they had been given instructions by the installing agencies, but the performance of chulhas and knowledge about their operation among the users highlighted that instructions given by the installing agencies was not adequate. This has happened due to either lack of proper knowledge about the improved chulhas among the workers of installing agencies themselves or the users



could not follow and understand properly the instructions given by the installing agencies. When discussion was made with the users of the chulhas at the time of investigation it was observed that the users were not properly aware about the operation of these chulhas. The analysis of data regarding the level of instructions given to the users and performance of their chulhas suggest a systematic approach for making wide publicity about the chulhas through a appropriate and viable media in the rural areas and at the same time the programme needs a provision of proper instructions about the operation of these chulhas to the users by either the installing agencies or other body involved in the programme.

Pattern of solution related to the problems in Improved Chulhas:

The respondents of the sample households were asked about the practices adopted by them to solve the problems if chulhas developed any problem. During investigation it is observed that there had been mainly two approaches adopted by the users to solve the problems; either they tried to remove the problem by repairing or changing the chulhas or started just to cook in their traditional chulhas. Data regarding the pattern of approach adopted by the users for the solution of these problems revealed

that 45.34 per cent users among those who reported any problem had tried to solve the problems themselves and 37.74 per cent respondents reported that in the case of any problem in their chulhas, they used to cook in their traditional chulhas without attempting to rectify the defect. Regionwise data in this connection showed that there has been a variation in the practices adopted to solve the problems related to improved chulhas, about 51.23 per cent users had sorted out their problems by themselves in the Central region, while in Eastern region 39.46 per cent users had solved the problems themselves. On the other hand, when any problem developed in the chulhas, about 41.90 per cent users had started cooking in their traditional chulhas in Central region and 33.58 per cent in Eastern region. One more variation has been observed in the approaches to solve the problems between the regions. About 19.36 per cent of the users had asked the mechanics to solve the problems in Eastern region as against 2.21 per cent in Central region. Some of the users reported that they had called the neighbour's help in solving the problems related to the chulhas and few of the users also approached the installing agencies to remove the problem, but their number was very limited. The limited number of users who had approached the

installing agencies revealed that either the concerning agencies did not show their responsibility to solve the problem after the installation work is over or the users did not know the installing agencies.

The high proportion of users who started to cook on the traditional chulhas when any problem developed in their improved chulhas highlighted the poor knowledge of improved chulhas and lack of proper instructions about the operation among the users.

Advantage of Improved Chulhas as viewed by users:

As we have already mentioned that 816 households having improved chulhas were surveyed and during the investigation it was found that only 52.94 per cent of the total improved chulhas were found working or being used and it varied from 46.18 per cent in Central region to 64.71 per cent in Eastern region. Data on the opinion of the users regarding the advantages of improved chulhas had been collected and the responses from the users were not working or not being used (though improved chulhas had been installed in their houses) did not express any views regarding the advantage of improved chulhas. As far as responses from the users regarding the advantage of improved chulhas are concerned, the users reported

multiple advantages. The cooking process on the improved chulha takes less time and consumes less fuel as compared to the traditional chulha were the main advantage as reported by maximum number of users. Data in this regard indicated that nearly 95.60 per cent users reported time saving in the cooking process by the improved chulhas as compared to traditional chulhas (Table-3.15). Using data related to time taken on collection of fuel wood etc. and on cooking by the users of the traditional chulha (discussed in the next chapter) as a proxy on the one hand, and details of time saving, as expressed by the users of the improved chulha, one can say that a considerable time is saved by way of using improved chulha in cooking as well as collection of fuel. Similarly, 94.44 per cent users also reported high rate of fuel efficiency in the improved chulhas than the traditional one. Cooking of more dishes at a time was also one of the advantages in the improved chulha as viewed by 89.35 per cent users.

Elimination of smoke from the house, as reported by 84.95 per cent users, was also one of the various advantages in the improved chulhas (Table-3.15). As a result of smoke elimination from the houses, 81.25 per cent users reported less diseases in their eyes as compared in traditional chulhas. As a result of proper



utilization of heat in improved chulhas, about 79.63 per cent users also experienced generation of heat in the improved chulhas at a comparatively higher rate. Similarly, more than half of the users said that less time and efforts are needed in cleaning the utensils as a result of cooking in the improved chulhas. Some of the users also felt that cooking in improved chulhas is comparatively safer than cooking in the traditional chulhas. Maximum numbers of users in each of the sample districts advocated several advantages of improved chulhas, though there has been variation in the number of users reporting advantages as far as different types of advantages are concerned.

Due to the technical defects in the improved chulhas at the time of their installation as well as lack of proper instructions among the users as a result of negligent and indifferent attitude of workers involved in this programme, the proportion of actual working chulhas was not found satisfactory. However, analysis of data from the users whose chulhas are in proper working condition revealed that the performance of the improved chulhas in the sample households had been very satisfactory. It is, therefore, very encouraging to note that the basic purpose of the programme (conservation of cooking fuel

and elimination of smoke) is being served by the improved chulhas in rural areas. The proper strategy of the programme regarding the installation/construction of improved chulhas without any technical defect as well as necessary instructions for their operation could lead to still better performance of these chulhas.

As we have seen that the requirement of fuel in improved chulhas was less as compared to traditional chulhas as reported by most of the users. In the same time, the users also reported that these chulhas also comparatively takes less time in the cooking. Data on fuel saving and time saving in the process of cooking through improved chulhas had been collected in percentage term as compared to the tradition chulhas from the users. Taking all the users together, the comparative data regarding fuel saving in improved chulhas and in traditional chulhas indicated that in the case of 17.59 per cent users, improved chulhas consumed 50.00 per cent less fuel than it was used in traditional chulhas and 48.84 per cent users were of the view that 66.00 per cent of the fuel consumption in traditional chulhas was required in improved chulhas. Similarly, 28.24 per cent users reported that the requirement of fuel in their

improved chulhas was three-fourth of the fuel consumption in traditional chulhas. However, in the individual sample districts, there has been variation in the proportion of users reporting different level of fuel consumption in their improved chulhas. The proportion of users who reported consumption of fuel 50.00 per cent less in improved chulhas than traditional chulhas was as high as 43.48 per cent in district Lucknow and as low as 0.67 per cent in Ghazipur. Within the regions, 8.33 per cent users in Eastern region reported that requirement of fuel in improved chulhas was half as compared to traditional chulhas, while this figure was 32.14 per cent in the Central region. However, the proportion of users who were reporting consumption of cooking fuel one-third less than the traditional chulhas, was 60.61 per cent in Eastern region and 30.36 per cent in Central region. A higher proportion of users in Central region reported that consumption of fuel in improved chulhas was 75.00 per cent of what the traditional chulhas consume.

Similar opinion was recorded from the users as far as time taken in cooking process by improved chulhas is concerned. Taking all the users together, 31.94 per cent users reported that cooking process in improved chulhas took half of the time than it was required in traditional

chulhas (Table-3.16). The proportion of users who who reported 50.00 per cent of time saving in the improved chulhas than in traditional chulhas was larger in Central region as compared to Eastern region. The number of users reporting one-third less time required in cooking than in traditional chulhas, constituted 33.56 per cent. Some of the users reported that the improved chulhas were taking 75 per cent of the cooking time in traditional chulhas as recorded in the case of 30.09 per cent users.

Fuel and time saving in improved chulhas by different size of families was also examined with a view to know the impact of family size on fuel and time saving as a result of cooking in improved chulha. Though significant variation in the trend has not been observed, however, the analysis revealed that big families experienced fuel and time saving at a higher rate in improved chulhas as compared to smaller size of families.

#### Utilisation of time saved in Improved Chulha:

We have mentioned earlier that a considerable portion of time is saved by the users as a result of cooking in the improved chulhas. As high as 95.60 per cent of the users reported that considerable time is saved in the improved chulha and data pertaining to the



utilisation of this time indicated that there were two main activities : domestic and agricultural work; as reported by the users, in which the saved time was utilised by them. Taking all the users together, it was found that 83.02 per cent users had utilised the time in their domestic work. Child care, animal care, and house cleaning were the main activities in the domestic work where the users of improved chulhas had spent their time thus saved in the cooking process. About 16.98 per cent users reported the utilisation of their time saved in agricultural activities. The users of improved chulhas in Central region has been at a higher proportion who had spent their time in agricultural activities as compared to Eastern region. Districtwise variations have been observed in the proportion of users reporting the utilisation of the time thus saved in the improved chulhas in different work.

After examining the advantages of improved chulha, it was revealed that national programme on improved chulha is not only proving a device to save cooking fuel and time with other environmental advantages, but also indirectly the use of improved chulha is helpful in other productive activities to the users as a result of utilising the time saved in cooking through improved chulha, thereby reducing health hazards as well.

## CHAPTER IV

### USERS OF TRADITIONAL CHULHA AND THEIR ATTITUDES TOWARDS THE IMPROVED CHULHA

#### Users of Traditional Chulha and the Programme of Improved Chulha:

The foregoing chapters tried to evaluate the impact of improved chulha and consumer perception towards the programme in terms of working pattern of improved chulhas, reasons for not working the chulhas, working pattern, advantages as viewed by the users, modification and changes made in these chulhas, operational problems, pattern of installation and agencies involved in the installation, knowledge and level of instructions among the users, their attitude towards the programme, opinion of the users and also short comings in the programme.

The study highlighted that lack of knowledge and awareness because of poor media for publicity and inappropriate methods applied, any programme for the betterment does not yeild fruitful results in the rural areas even

after spending huge amount of resources. In the context of national programme on improved chulha it seemed necessary to make valid strategy and healthy approach for the extension of the programme as well as for its wide coverage. For this purpose it would be appropriate to examine the awareness, level of knowledge and attitude towards the programme of improved chulhas among also the users of traditional chulhas. At the same time, to study the pattern of their fuel consumption in the traditional chulhas, time taken in collection of cooking fuel as well as in cooking process, their willingness to instal improved chulha in their houses and problems involved in their participation is essential for making improvements in the programme and for framing viable strategy to the extension of the programme.

For this purpose, the users of traditional chulhas had also been surveyed in the same sample villages where the users of improved chulha had been surveyed and relevant data had been collected from them. The users of traditional chulha constituted about 20.93 per cent of the total sample. The analysis of data collected from the users of traditional chulhas revealed that 77.78 per cent users had some knowledge about the programme of improved chulha. The proportion of households using

traditional chulhas who were aware about the improved chulhas was found higher in Eastern region (90.75%) as compared to Central region (64.82%). As we have already discussed that voluntary organisations were actively engaged in the programme in Eastern Region. Labour Organisation of Rural Poor is one of main voluntary organisations which is also sharing the responsibility to instal the improved chulha apart from their other activities in the rural areas of Eastern region. Due to wider coverage of their activities, the rural people were familiar with the programme at a higher rate through them. It was also observed that awareness about the improved chulha among the households of traditional chulhas was at a higher degree in the case of households headed by educated persons. About 49.53 per cent of the head of these households were uneducated and among them 70.09 per cent were found aware about the improved chulha, whereas the proportion of households who were aware was 85.32 per cent in the case of households with their educated head. The proportion of non-users who were found aware about the improved chulha had shown a increasing trend with the <sup>increasing</sup> level of education among their head; showing higher the educational level among head of the family, larger the proportion of awared persons.



The individual districts had shown a variation in the proportion of users of traditional chulhas who were aware about improved chulha as recorded by 68.52 per cent users in Lucknow, 61.11 per cent in Barabanki, 81.48 per cent in Azamgarh and 100 per cent in Ghazipur (Table-4.1).

When we examine the source of first hand information about improved chulha to the users of traditional chulhas, it is recorded that Government officials and voluntary organisations had also been main sources among the non-users of improved chulhas as earlier we have seen in the case of users also. However, their contribution in providing first hand information to the non-users was found in different order. Taking all the non-users together, 51.19 per cent of them received the first hand information from voluntary organisations and 29.76 per cent non-users had been benefited by getting first hand information about improved chulha from Government officials (Table-4.1). The other sources in this regard were relatives, newspapers and Gram Pradhan and these sources gave first hand information to 5.95 per cent, 5.36 per cent and 4.76 per cent users respectively. The regionwise data about the first hand information revealed that the voluntary organisations had given first hand information

to 55.10 per cent non-users in Eastern region and 45.71 per cent in Central region. A significant variation has been observed in the contribution of different sources for providing first hand information. About 11.43 per cent users of traditional chulhas had received the first hand information from the newspaper in Central region while merely 1.02 per cent know the improved chulha through newspaper in Eastern region.

Reason for not Installing Improved Chulha:

The users of traditional chulhas had been asked the reasons for not having installed the improved chulhas in their houses and it was recorded that nearly one-fourth of the households were not aware about the improved chulha at the time of investigation. This reason had been main among other reasons for not installing the improved chulhas by the users of traditional chulha. It was rather surprising to note that 20.83 per cent users of traditional chulhas were not aware about the improved chulha in such villages where improved chulhas had been installed in some houses (Table-4.2). The users who were not aware about the programme indicated that these households had not been approached by none of the installing agencies. The individual regions had shown

instal improved chulha and to what extent they were interested? Data regarding to their willingness to instal improved chulha had been collected from the users of traditional chulhas.

During the time of investigation, the members of the research team engaged in the field survey also gave the first hand information to many of the users of traditional users. After getting the knowledge about the improved chulha and its advantages, a considerable number of users had shown their willingness to instal improved chulhas in their houses as we have already mentioned that due to the problem of breakage in the pucca houses for the purpose of chimney, these households had not installed improved chulha, however, majority of them were ready to instal improved chulha if the repair work is done by the installing agency after the installation work is over. Data pertaining to number of households interested to instal improved chulha revealed that 70 per cent users of traditional chulha were interested taking all the sample household (users of traditional chulha) together (Table-4.3). Comparative figures regarding the number of interested households between the two regions indicated that in the Eastern region, 74.07 per cent users of traditional chulha were interested to instal the improved chulha while 64.81 per cent users of traditional chulha were interested in Central region. In the individual

districts this figure varied from 59.25 per cent in district Barabanki to 81.48 per cent in Ghazipur (Table 4.3). Various reasons had been given by the interested households to instal improved chulha. Among others, time and fuel saving, smoke elimination and cleanness of utensils were the main advantages as reported by the interested users. About 62.92 per cent users were of the opinion that comparatively less efforts are needed to clean the utensils through cooking in improved chulha. Time saving in cooking by improved chulhas had also been one of the reason for having their interest in improved chulhas reported by 71.52 per cent of those who were willing to instal improved chulha (Table-4.3). Similarly among the interested households who had shown their interest to instal improved chulha in their houses fairly 72.85 per cent also pointed out that cooking in improved chulha saves fuel at a considerable rate. The advantage of smoke elimination from the houses as a result of improved chulha had also been as a reason by a significant proportion (80.13%) of interested users of traditional chulhas.

When the data on the proportion of households which were interested in improved chulhas and the type of houses are analysed, it is found that differentials have been recorded in the proportions of interested households



with their different types of houses. The households having kuchha houses had shown greater interest as compared to the households having pucca houses. However, the household, who had their mixed type of houses were mostly found interested to instal improved chulhas.

After the great interest shown by the non-users to instal improved chulhas in their houses, they had been asked whether they had approached any one for installation of improved chulha. Data pertaining to number of households who did not approach any agency for the purpose of installation of improved chulha revealed that about 55 per cent households with traditional chulha did not approach any one. Among the individual districts, it is recorded that proportion of households who did not approach varied from 33.33 per cent in district Azamgarh to 70.37 per cent in district Barabanki (Table-4.4). When we look at the regionwise figures it is found that the proportion of households who did not approach was comparatively higher in Central region as against in the Eastern region. The comparative figures indicated that the households in Eastern region were relatively more progressive. Several reasons had been pointed out by these households for not approaching any one. Among the reasons, lack of interest, lack of proper knowledge

about the installing agency, space problem, fear of breakage in their pucca houses and fear of taxes in future dates were the main as reported by the users of traditional chulhas. About 25.00 per cent households were not interested to instal improved chulha simply because of failure of improved chulhas in other houses in the village. Majority of the households who did not try to approach any agency, pointed out that they did not know the actual installing agency or the appropriate department as well as lack of knowledge about its procedure. This reason had been given by 73.65 per cent non-users who did not approach. Similarly, in the case of 36.84 per cent households, lack of space for the installation of improved chulha in their houses had also been one of the reasons for not approaching (Table-4.4). It has been observed that some of the households did not approach any one to instal improved chulha due to space problem had shown their interest to instal in future when space would be available. There was no special place meant for cooking purpose in these houses. Taking all the sample households together, about 21.76 per cent households of traditional chulha who did not approach any one reported that they did not want any kind of breakage in their pucca houses for the purpose of having improved

chulha. In this respect, the districts have shown wide variation but the individual regions have not recorded any variation. In the case of other recorded reasons, the proportions of households varied from one region to another. One peculiar observation had been recorded that some of the households did not want to instal improved chulhas because the government may impose taxes on them and the fear of taxes in future dates, as a reason for not approaching, had been for 12.82 per cent of users.

As far as number of users of traditional chulha who had been approached by the agencies for the installation of improved chulha is concerned, it is found that very few households had been approached by the installing agencies reported by 26.85 per cent users. The region-wise figures indicated that in the Central region, 20.37 per cent households had been approached by the installing agencies while approach had been made to 33.33 per cent cases in Eastern region. Among the individual districts the percentage of such households varied from 16.67 per cent in district Lucknow to 46.29 per cent in district Ghazipur. It seems that the infrastructural facilities regarding the national programme on improved chulha was relatively better in Eastern region as compared to Central region.



The users of traditional chulhas had been asked about their views regarding the improved chulha. Out of 216 users of traditional chulha, 62 users, accounting 28.70 per cent; reported that improved chulha is better than the traditional chulha. About 60 per cent of the non-users did not express any opinion regarding the improved chulha. The proportion of users, who were reporting that improved chulha is better, was relatively higher in Central region as compared to Eastern region. The fact that despite having knowledge of the improved chulha and its various advantages people have shown little interest in them goes to show that there has been lack of proper motivation both at the level of governmental and voluntary organisations.

Information was collected from the users of traditional chulha whether they collect cooking fuel free of cost or they use to purchase? Data regarding collection of fuel revealed that about 81.00 per cent households were collecting cooking fuel free of cost. The proportion of households who were collecting free of cost was significantly higher in the Central region as compared to the Eastern region. As we have already mentioned that households were collecting fuel-wood either from their farm trees or orchards or nearby bushes. As far



as dung cakes and crop residues are concerned it has been seen that except landless households and households without any cattle were generally using dung cakes and crop residues from their own sources. About 19.00 per cent households were found purchasing cooking fuel. However, the periodicity of their purchasing was not regular and similar in all the cases. Taking all the sample households together, data regarding the periodicity of purchasing the fuel wood indicated that among the households who were purchasing 9.75 per cent users of traditional chulha were purchasing fuel wood on a regular basis households were purchasing sometimes, at the same time 42.90 and 46.35 per cent ~~percent~~ reported that they used to purchase cooking fuel rarely. Regionwise data in this regard indicated that 12.96 per cent of the users of traditional chulha were purchasing the cooking fuel in Central region where as in the Eastern region 25.00 per cent households reported purchasing of fuelwood. Similarly, a variation has been observed in the periodicity of their purchases and recorded that the proportion of households who were purchasing regularly constituted higher percentage in Eastern region as compared to Central region. It has been observed that the landless households having no cattle heads were generally purchasing cooking fuel either in the form of fuelwood or dung cakes.

As we have already mentioned that 20.83 per cent users of traditional chulha were not aware about the improved chulha. However, 50.00 per cent of the total sample households using traditional chulhas reported the advantages of improved chulha. After seeing the performance of improved chulha in other houses generally the users gave three advantages: Fuel saving, time saving and elimination of smoke: from the improved chulha. Among the users of traditional chulha who reported the benefits of improved chulha, about 50 per cent reported less fuel consumption, 36.55 per cent reported time saving and 13.79 per cent were of the view that elimination of smoke from the houses is possible by improved chulha.

Time taken in cooking and collection of fuel by the users of Traditional Chulha:

During the field survey, data regarding time taken in cooking and collection of fuel had also been collected from the users of traditional chulha in the sample households. The analysis of data indicated that generally cooking was taking comparatively more time than the collection of cooking fuel by the households. Taking all the sample households together it was recorded that cooking in traditional chulha, as reported by the users, was taking 2.92 hours daily by a family

(Table-4.5). Monthwise figures indicated that at least 87.60 hours were spent by a family in the cooking. When regionwise data were analysed regarding time taken in cooking by these households, it was found that cooking was taking comparatively more time by the households in Eastern region as compared by the households in Central region. This variation was simply due to the use of different kind of fuel in the cooking by the households.

The main sources of cooking fuel in the sample households were the firewood, dung cake and crop residue and these sources contributed about 35.79 per cent, 36.08 per cent and 17.25 per cent respectively to the total fuel consumption for cooking. It was observed that forest resources were found absent in these sample villages. As far as collection of firewood is concerned, the general practices adopted by the households in the sample villages revealed that firewood are collected from the trees in the farm, orchards, road and canal side and from the bushes around the villages. Data on time taken in the collection of fuel recorded that per day at least 2.20 hours were needed to collect the cooking fuel by a family using traditional chulha (Table-4.5). It has been found that the households in Central region needed comparatively more time in the collection of cooking fuel than the

households in Eastern region. The availability of cooking fuel (whatever the households use) was found comparatively more in the village of Eastern region than in the villages of Central region. The per day time spent on collection of fuel by the households of the individual district varied from 1.55 hours per household in district Barabanki to 3.11 hours per household in district Lucknow (Table-4.5). Over all, a family was spending at least 66 hours in a month to collect fuel for cooking purpose.

When data on time taken in collection of fuel and cooking of meal by the sample households are examined with different size of families, it is found that the collection of fuel was comparatively <sup>taking</sup> more time in the case of small family as compared to the big size of family. Higher the number of members in the family lesser the time required for collection of fuel. It has been recorded that a household having less than three members in the family was requiring 2.45 hours a day for fuel collection and at the same time the household with more than ten members in the family needed only 1.96 hours in a day to collect fuel for cooking purpose (Table-4.6). However, in the case of cooking, the households had shown the reverse pattern. As far as time spent on



cooking is concerned, it was found that cooking was taking comparatively more time in the family of smaller number than the family of larger size. Data in this regard revealed that a household which had less than three members was spending 2.14 hours per day on cooking and on the other hand, which had more than ten members in the family, cooking was taking 3.92 hours a day (Table-4.6).

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

The evaluation of national programme on improved chulha was carried out in the rural areas of Central and Eastern regions of Uttar Pradesh with a view to examine the impact of improved chulha programme and consumers perception regarding the performance of improved chulha and their attitude towards the programme. The study also analysed awareness, participation, willingness and views of the users to evaluate the performance of improved chulha in terms of its objectives. It attempted to review the pattern of installation of improved chulha, maintenance and the operational problems in addition to the advantages of improved chulha by way of fuel and time saving, environmental cleanness and other benefits. The users of traditional chulha were also studied to find out their awareness about the improved chulha, willingness to instal and attitude towards the programme. The study is based on the survey of 1032 selected households (816 households with improved

chulha and 216 households using traditional chulha). To cover this sample, 12 villages had been surveyed from two selected districts in each region viz., Lucknow and Barabanki from Central region and district Azamgarh and Ghazipur from the Eastern region.

The study analysed the socio-economic background, i.e., social group of the household, family composition, education, occupation and economic status, land holding and provision of infrastructure available in the houses. It also analysed the information about the improved chulha installed in the house, type of chulha, installing agencies, type of fuel required in the improved chulha and the performance of these chulhas. Similarly, the views of the users, their attitude and participation towards improved chulha programme, changes made in improved chulha by the users and the level of instructions about the operation of the improved chulha among the users have also been investigated. At the same time, households using traditional chulha have also been examined in terms of their level of knowledge and attitude towards the national programme, willingness to instal and reasons for not installing the improved chulha. The study highlighted the constraints, viz.,

economic, social cultural and institutional in the proper performance of the programme as well as in the extension of the programme.

The field survey of the sample households in the selected villages was done during March-May 1987 and detailed investigation was carried out by the members of the research team who had been given practical training in the construction and operation of improved chulha. A structured questionnaire was used for this purpose and information had been recorded. In Uttar Pradesh, the responsibility of implementing the national programme on improved chulha has been taken by state government and the Development of Non-conventional Energy Development Agency U.P. The state government is implementing the programme in different areas through various agencies. The installation work of improved chulha in the sample households was done by four different agencies, viz., Non-conventional Energy Development Agency (NEDA), Extension Training Centre (ETC), Chandra Bhanu Rural Development Agency (CBRDA) and Labour Organisation of Rural Poor (LORP). The first two are government/semi-govt. agencies and latter are voluntary organisations.



The total households in the sample accounted 18.51 per cent of the total households of the selected villages in Central region and 38.48 per cent in Eastern region and over all, 25.00 per cent households had been surveyed. The average family size in the sample households was 6.78 in aggregate; 5.97 in district Lucknow, 6.10 in Barabanki, 7.96 in Azamgarh and 7.11 in Ghazipur. Proportionate sample was taken from each of the social groups in the selected villages. The proportion of households having improved chulhas in the sample was 25.98 per cent from general caste, 38.48 per cent from SC/ST, 25.86 per cent from Backward caste and 9.68 per cent from Muslim. In the case of households using traditional chulhas the social groups like, general caste, SC/ST, Backward caste and Muslim constituted 26.39 per cent, 41.67 per cent, 28.24 per cent and 3.70 per cent respectively to the sample. There were 867 females for every 1000 males in the sample households and variation had been recorded in the sex ratio in the individual districts. As far as head of the family is concerned, the most of the households in the sample had males as the head of their families and it accounted 97.19 per cent. The educational level among the head of households indicated that over 43 per cent were illiterate, 21.22 per cent had primary

level education, 31 per cent had between primary and Intermediate. Merely 4.75 per cent head of households were graduate and above.

The occupational pattern of head of households indicated that about 58 per cent were engaged in agriculture, 9.78 per cent had their business as an economic activity and <sup>remaining</sup> 2.2 per cent head of households were earning their livelihood from other non-agricultural sources. The economic status of family members in the sample households revealed that the proportion of persons engaged in any productive activity recorded as 26.54 per cent in district Lucknow, 27.83 per cent in Barabanki, 21.56 per cent in Azamgarh and 21.15 per cent in Ghazipur and the over all proportion was 23.96 per cent. The ratio of earning members was found 1.63 in a average family size of 6.79 persons. The school going members constituted about 68.87 per cent in the total population of school going age group in the sample households. This proportion was higher in the households of Eastern region as compared to Central region. As far as literacy level in the sample households is concerned about 41.00 per cent were illiterates. The proportion of illiterate persons was found higher in Eastern region as compared to Central region. The higher proportion of school going

children and lesser proportion of illiteracy among the population of sample households in Eastern region was due to availability of educational institutions near the sample villages in the region.

The housing structure of the sample households indicated that only 30.27 per cent houses with improved chulhas had pucca houses. While 26.39 per cent households had pucca houses in the case of users of traditional chulhas. The sample households in the Eastern region had pucca houses at a higher proportion as compared to Central region. Taking all the sample households together, only 9.79 per cent households had the provision of separate kitchen in their houses. It was found that households with separate kitchen was at a higher percentage using improved chulhas as compared to households using traditional chulha. Though there was a provision of electricity in four out of 12 sample villages, only 1.84 per cent households in the sample were found electrified. The proportion of households which had the provision of latrine and bathroom in their houses accounted 2.91 per cent and 3.00 per cent respectively. At the same time, the proportion of such households was comparatively higher in the case of households having improved chulha than the households using traditional chulha.

In both the regions, fixed type of improved chulha had been installed in the sample households. The NADA model of improved chulha is most popular and all the chulha were found to be two-pot type. Consumption of fuel in improved chulha indicated that fuelwood, dung cakes and crop residues were generally being used by the users in all the sample villages. Though due to availability, a little variation had been observed in the proportion of different kinds of cooking fuel in the sample districts.

In our sample households 41.67 per cent improved chulhas had been installed by NEDA, 25.00 per cent by LORP, 25.00 per cent by ETC and remaining 8.33 per cent by CBRDA. In the sample households of Central region the improved chulhas had been installed by NEDA (66.67%) and CBRDA (33.33%). In the case of Eastern region the improved chulhas had been installed by ETC and LORP equally.

When we examined the source of first hand information to the users about the programme of improved chulha, it was found that the information was received by the users through various sources. The government officials and voluntary organisations were found main among the sources.



The village Pradhan had also played a significant role in this regard. Due to lack of education in rural areas as well as lack of mass media like Radio, T.V., newspapers and other literature, these sources did not show any effective role.

It was observed that the motivation had been an effective means for the installation of most of the improved chulhas. In this regard the village Pradhan had played a key role by motivating the households for installing the improved chulhas in their houses. The second major motivators had been the government officials and voluntary organisations. In Central region, village Pradhan had motivated about 90.00 per cent users while in Eastern region only 7.89 per cent users have been motivated. The government officials had motivated to 48.77 per cent users in Eastern region and 6.86 per cent in Central region.

The door to door investigation of the sample households having improved chulha revealed that 52.94 per cent were found in working order or being used at the time of survey. When we compare the working condition of improved chulhas between the regions it was found that in the Eastern region higher percentage of improved chulhas

were perfectly working or being used as compared to Central region. In the individual sample districts it was found that 37.25 per cent in Lucknow, 45.10 per cent in Barabanki, 55.88 per cent in Azamgarh and 73.59 per cent in Ghazipur, the improved chulhas were working or being used. When we examined the performance of improved chulhas installed by different agencies, it was found that 64.11 per cent of the chulhas installed by NEDA, 50.98 per cent by ETC, 32.33 by CBRDA and 19.61 per cent by LORP were either not working or not being used by the users. It has been observed that lack of proper guidance about the operation of improved chulhas among the users as well as some kinds of inbuilt technical defects in the chulhas, were the main reasons for the poor performance of these chulhas.

As a result of inadequate knowledge about the operation as well as lack of instructions among the users, changes had been made in the chulhas by 45.83 per cent users. Among the changed chulhas 90.11 per cent were seen properly working. On the other side only 21.49 per cent were working among those in which no changes had been made. Over all, the performance of improved chulhas installed by voluntary organisations had been found relatively better as compared to improved chulhas

installed by other agencies. The education of head of households had shown a positive impact on the performance of improved chulha. The proportion of improved chulha which were found working recorded at a higher rate in the households where the head was educated.

Various reasons had been given by the households for not using or non-functioning of the chulhas. Among the reasons, high fuel consumption in the improved chulhas was reported by most of the households. The high consumption of fuel by these chulhas was simply because of improper handling of chulhas. Lack of proper instructions about the operation of improved chulha among the users and technical defects at the time of installation had been main factors behind the improper handling of chulhas. The investigation revealed that in some chulhas either the fire box was not in accordance with the size of chulha or pot-holes were not in proper shape or the baffle was not appropriate or dampers or chimney were removed. Due to disorder of various components of improved chulha the households reported high fuel consumption. Non-elimination of smoke by the improved chulha was also one the reasons for not using the improved chulha as reported by the households. Most of them were ignorant about the proper use of chimney, and its proper cleaning,

that is why the smoke could not be eliminated. In some cases, the chulhas had not been properly constructed. Due to the lack of proper instruction among the users about the proper operation of improved chulha, these chulhas did not show fuel efficiency as well as smoke elimination. Some chulhas were working properly in the beginning but in due course of time, some problem developed in their working systems, consequently the users started cooking on traditional chulhas. It had been observed that most of the problems developed in the chulhas could have been solved by giving proper instructions to the users and through provision of repairing and maintenance facilities.

At the same time the necessity of change in the chulhas could have been checked by installing the chulhas in a proper way without any technical defects. This could be evidenced by the fact that 45.83 per cent sample households had to make alterations in their chulhas, and most of them had made more than one change. Secondly, the chulhas became in working condition at a higher proportion, when changes were made in them. In some cases the pot-hole size was not found according to the size of vassel which resulted waste of heat



at a considerable proportion and at the same time the smoke could not be eliminated. The practice of removing front damper for cooking CHAPPATI had been seen in most of the chulhas. In some cases, the households had changed feeding chambers though the chambers were proper at the time of installation. Due to lack of proper instructions about the operation and lack of knowledge about the chulha, the households used big pieces of solid fuel, as a result the fire box had been made according their will. The improper combination of operational norms had shown high consumption of fuel as well as more time in cooking. The performance of chulhas and frequency of changes made in these chulhas indicated that the improved chulhas installed by voluntary organisations proved more successful. As we have observed that the users of improved chulhas were comparatively found more aware about the operation in case the chulha had been installed by the voluntary organisations. Similarly the chulhas installed by them were found in working order at a higher proportion. Fear of accident was also one of <sup>the</sup> reasons for not being used the improved chulha as reported by some of the households.

As far as instructions given to the users by the installing agencies are concerned, only 59.06 per cent households reported that they had been given instructions

about the use of improved chulhas. The instructions, however, given by the installing agencies were not upto desired level. At the same time instructions too were not followed by the users properly. The region wise data in this regard revealed that the proportion of household accounted higher in Eastern region than in the Central region. When the performance of chulhas and the proportion of actual working chulhas are seen, it was found that the proportion of actual working chulhas was found considerably higher in the households who had been given instructions as compared to households without instructions. When the data on the level of instructions given to the users by different installing agencies was examined; it was recorded that the instructions had been given by the voluntary organisations to higher percentage of users as compared to other agencies. Similarly the households who had been given instructions had made fewer changes in their chulhas.

The performance of improved chulhas and the level of knowledge about their operation among the users highlighted that instructions given by the installing agencies were found inappropriate and this has happened due to either lack of proper knowledge about the improved chulhas among

the workers of installing agencies or that users could not properly understand and follow the instructions given to them. The problems regarding instructions could be removed by time to time visits of installing agencies to the households after the installation to a great extent.

The practices adopted by the users to solve the problems in the chulhas revealed that generally there had been mainly two approaches adopted by the users to solve the problems; either they used to solve the problem by repairing the chulhas or used to start cooking in traditional chulhas. Data regarding the pattern of approaches adopted by the users for the solution of these problems revealed that 45.34 per cent users among those who reported any problem, had tried to solve the problems themselves and 37.74 per cent respondents reported that in the case of any problem in their chulhas, they used to cook in their traditional chulha without attempting any other approaches. The percentage of households who had started cooking in their traditional chulhas when any problem developed was comparatively higher in central region than Eastern region. The mechanics had been consulted by the higher proportion of households in Eastern region as compared to Central region. The limited numbers of users who had approached the installing

agencies revealed that the concerning agencies did not show their responsibility to solve the problems after the installation work is over. At the same time the users did not know the installing agencies and their working process. The pattern of approaches adopted by the users in case any problem developed, suggests an urgent need for a provision of follow-up scheme, so that once the chulha is installed, the same should work on a regular basis. Similarly, time to time visit of the concerning agencies would help the users to understand the instructions about the operation of improved chulha. The follow-up scheme is helpful not only for the proper performance of chulha, but also it would lead to a feeling of self-sufficiency among the users for repairing the chulhas in future dates.

The advantages of improved chulha as viewed by the users indicated that improved chulha takes less time and consumes less fuel as compared to the traditional chulha. Time and fuel saving in improved chulha had been the main and common advantage as reported by 95.60 per cent and 94.44 per cent users. Cooking of more dishes at a time was also one of the advantages in the improved chulha as reported by 89.35 per cent users. Apart from other advantages, elimination of smoke was also reported by 84.95 per cent users. As a result of elimination



of smoke in the houses, 81.25 per cent users experienced less diseases in their eyes. Similarly, generation of more heat in improved chulha as compared to traditional chulha and requirement of less time and efforts in cleaning the utensiles as result of cooking in improved chulha had been reported by several users.

The data regarding fuel saving in improved chulha than in traditional chulha indicated that in the case of 17.59 per cent users, improved chulha consumed 50.00 per cent less fuel than it was used in traditional chulha and 48.84 per cent users were of the view that 66.00 per cent of the fuel consumption in traditional chulhas was required in improved chulha. Similarly, 28.24 per cent users reported that the requirement of fuel in their improved chulha was 75.00 per cent of the fuel consumption in traditional chulhas. The similar opinion was recorded from the users as far as time taken in cooking process by improved chulha is concerned. Among the users, 31.94 per cent reported that cooking process in improved chulha was taking half of the time than it was required in traditional chulha. The number of users reporting 33.00 per cent time saving in improved chulha than the past constituted 37.97 per cent. In case of 30.09 per cent users, improved chulhas were taking 75.00 per cent of the cooking time in traditional chulhas.

As we have seen that a considerable portion of time was saved in cooking process through improved chulha as reported by 95.60 per cent users. The utilisation of time saved in cooking indicated that there were two main activities namely, domestic and agricultural work, where the saved time was utilised by the users.

To know the constraints in the extension of the national programme on improved chulha and in its wider coverage, it was thought to study the level of knowledge and awareness about improved chulhas, attitude towards the programmes, willingness to instal improved chulha and problems involved in their participation among the users of traditional chulhas had also been surveyed in the same sample villages where the investigation of improved chulhas had been carried out. The analysis of data collected from the users of traditional chulhas revealed that 77.78 per cent users had some knowledge about the programme of improved chulha. This percentage was found higher in the sample villages of Eastern region (90.75%) as compared to Central region (64.82%). The knowledge and awareness of improved chulha among the users of traditional chulha was comparatively at a larger proportion among the families headed by the educated persons.

The source of first hand information about improved chulha to the users of traditional chulha was examined and it was recorded that voluntary organisations and government officials had been the main source of first hand information among the users of traditional chulhas. The proportion of their contribution, however, was found different in the case of users of traditional chulhas. About 52.00 per cent users had been given the first hand information about the improved chulha by the voluntary organisations where as 29.76 per cent users of traditional chulha had received this information from the government officials.

The users of traditional chulhas had been asked about the reasons for not having installed improved chulha in their houses. At the time of investigation, some of them were not found aware about improved chulha. This reason had been main among other reasons for not installing improved chulhas. It was rather surprising to note that 20.83 per cent users of traditional chulha were not aware about the improved chulha in such villages where improved chulhas had already been installed in many houses. The figures indicating the non-awareness about the improved chulha highlighted the fact that the installing agencies had been confined



their work to limited households and their motive had been mainly to instal the targeted figures of improved chulha rather than to propogate the national programme villagewide.

The proportion of households using traditional chulhas who were not aware about improved chulha accounted at a higher rate in Central region as compared to Eastern region. The over all performance of national programme on improved chulha had not been found satisfactory in the sample districts of Central region which could also be evidenced with the fact that the larger proportion of household were not aware about improved chulha in that region, even these districts are nearer to state capital and the implementing machineries. The second major reason for not installing improved chulha had been the lack of space in the houses for the purpose of installation. The problem of breakage in the pucca house had also been realised by the non-users in installing the improved chulha. Due to lack of knowledge about the advantages of improved chulha, the female members of some households were not interested in having an improved chulha. Fear of fire, feeling of superstition and unsuitability for cooking all the dishes, had been the other reasons for not installing improved chulha.



Most factors responsible for not installing improved chulha as reported by the users of traditional chulha could be removed by way of wide publicity about improved chulha and the provision of proper direction to the installing agencies about making people fully aware about the improved chulha and its advantages.

Door to door visit of the survey team, made some households aware about the programme. After getting the knowledge about the improved chulha and its advantages, a considerable number of non-users had shown their interest to instal improved chulha. About 70.00 per cent users of traditional chulha were interested to instal improved chulha in their houses. The proportion of such users was recorded higher in the Eastern region as compared to Central region. After observing the performance of improved chulha in other houses various reasons; including time and fuel saving, smoke elimination and cleanness of utensils, had been given by the users of traditional chulha for their interest in improved chulha. About 50.00 per cent of the users of traditional chulha reported the advantages of improved chulha. The proportion of interested users was found higher in the case of households having their kuchha houses.

Data about the approaches made by the users of traditional chulha revealed that about 55 per cent households did not approach any one for the installation of improved chulha. Several reasons had been pointed out by these households for not approaching any one. Among the reasons, lack of interest, lack of proper knowledge about the installing agency, space problem, fear of breakage in the pucca houses and fear of taxes in future dates were the main reasons as reported by users of traditional chulha. About 25.00 per cent households were not interested to instal improved chulha simply because of failure of improved chulhas in other houses. Majority of the households who did not try to approach any agency reported that they did not know the actual agency involved in installation of improved chulha or the appropriate department as well as lack of knowledge about its procedure.

As far as approach had been made by the installing agencies to the users of traditional chulha is concerned, it has been recorded that 26.85 per cent users of the traditional chulha had been approached by the installing agencies to instal improved chulha. In the Eastern region, comparatively higher proportion of users had been approached by the installing agencies than in the Central region.

Data regarding the pattern in collection of fuel among the households using traditional chulha revealed that 81.00 per cent households were collecting cooking fuel, free of cost and 19.00 per cent households were purchasing cooking fuel. However, the periodicity of purchasing fuel was not regular as well as not similar in all the cases. Among the households who were purchasing the cooking fuel, it was found that merely 9.75 per cent users of traditional chulha were purchasing fuel wood on a regular basis. The landless households having no cattle heads were generally purchasing cooking fuel either in the form of fuel wood or dung cakes.

Generally, the cooking fuel is collected by the users themselves. The fuel wood is collected from the farm trees, orchards and from nearby bushes. Similarly dung cakes are prepared and crop residues are collected by the users from either their own farms and from other farms. We tried to measure the time taken for fuel collection as well as for cooking the meal by the household using traditional chulhas and it was found that cooking process in the households using traditional chulha was taking relatively more time than the collection of fuel. A household was spending at least 2.92 hours daily in cooking. On an average, each



family was spending about 87.60 hours monthly in cooking.

Data on time taken in the collection of fuel recorded that per day at least 2.20 hours were needed to collect the cooking fuel by a family using traditional chulha. Monthly figure indicated that 66 hours were being spent in the collection of fuel by a household using traditional chulha. When data on time taken in collection of cooking fuel as well as in cooking are examined according to the family size, it revealed that higher the number of members in the family lesser the per capita time required for collection of fuel. However, in the case of cooking, the households had shown the reverse pattern and comparatively more time was required for cooking in big size of family.

To sum up, therefore, on the basis of performance of actual working chulha, it is observed that the National Programme on Improved Chulha is serving the basic objectives of the programme. Due to improper implementation and lack of monitoring system in the programme, the performance of improved chulha in a number of cases is not found upto desired level. It seems that the installing agencies have adopted the target oriented approach (to instal maximum number of chulhas) rather



than the quality and functioning of the chulhas. Approach to instal more and more number of improved chulha by the Government without any monitoring system might affect the scheme adversely due to certain practical difficulties in the actual implementation. The provision of necessary training and instructions in proper way to the users about the operation as well as guidelines for the proper use of the chulha would also facilitate the maintenance of chulha. There should be provision of repairing in the houses where breakage is done for the installation of improved chulha by the installing agencies. A sufficient, suitable, and timely publicity of eventual efforts and promising results of the programme is the key for creating and maintaining the favourable atmosphere and tempo about the programme. Regular and timely visits by the concerning departments, constant public contacts and frequent follow up actions are the sure ways for gearing up and making proper extension of the improved chulha programme.

The programme of improved chulha in the rural areas is getting wider publicity from year to year as well as the participation of users and involvement of installing agencies are also increasing. This could be evidenced with the fact that improved chulhas are found working comparatively at a higher proportion among the chulhas which have been installed recently than the chulhas installed one or two years ago. Chulhas installed during 1987 were working significantly at a higher rate than chulhas installed during 1985 and 1986.

Table 2.1 : Average Family Size of the Sample Households (Users of Improved and Traditional Chulha)

Region/District	Households having Improved Chulha			Households having Traditional Chulha			Total
	Sample Size	Total Population	Average Family Size	Sample Size	Total Population	Average Family Size	
	Sample Size	Total Population	Average Family Size	Sample Size	Total Population	Average Family Size	
<u>1. CENTRAL REGION</u>							
(a) Lucknow	204	1242	6.09	54	299	5.54	1541
(b) Barabanki	204	1247	6.11	54	327	6.06	1574
Total	408	2489	6.10	108	626	5.80	3115
<u>2. EASTERN REGION</u>							
(a) Azamgarh	204	1580	7.75	54	474	8.78	2054
(b) Ghazipur	204	1482	7.26	54	352	6.52	1834
Total	408	3062	7.50	108	826	7.65	3888
BOTH THE REGIONS	816	5551	6.80	216	1452	6.72	7003
							6.79

Table 2.2 : Classification of Sample Households According to their Castes

Region/District	Households having Improved Chulha			Households having traditional Chulha		
	General Caste	SC/ST	Backward Caste	Muslim	Total	General Caste
<b>1. CENTRAL REGION</b>						
(a) Lucknow	35 (17.16)	97 (47.55)	61 (29.90)	11 (5.39)	204 (100.00)	7 (12.96)
(b) Barabanki	27 (13.24)	86 (42.16)	61 (29.90)	30 (14.70)	204 (100.00)	6 (11.11)
(c) Total	62 (15.20)	183 (44.85)	122 (29.90)	41 (10.65)	408 (100.00)	13 (12.04)
<b>2. EASTERN REGION</b>						
(a) Azamgarh	63 (30.88)	85 (41.67)	41 (20.10)	15 (7.35)	204 (100.00)	17 (31.48)
(b) Ghazipur	87 (42.65)	46 (22.55)	48 (23.53)	23 (11.27)	204 (100.00)	27 (50.00)
(c) Total	150 (36.77)	131 (32.11)	89 (21.81)	38 (9.31)	408 (100.00)	44 (40.74)
<b>BOTH THE REGIONS</b>	212 (25.98)	314 (38.48)	211 (25.86)	79 (9.68)	816 (100.00)	57 (26.39)

Note : Figures in brackets are the percentages to the total sample of respective districts and regions.



Table 2.3 : Occupation of the Head of Sample Households

Region/District	Households having Improved Chulha					Households having traditional chulha				
	Sample Size	Agri-culture Labourers	Non-Agri-culture Labourers	Service Labourers	Business Employed	Sample Size	Agri-culture Labourers	Non-Agri-culture Labourers	Service Labourers	Business Employed
1. CENTRAL REGION										
(a) Lucknow	204 (100.00)	59.31	3.92	10.78	11.77	13.24	0.98	54 (100.00)	55.56	20.37 - 16.66 7.41
(b) Barabanki	204 (100.00)	62.26	3.92	5.88	14.71	11.26	1.96	54 (100.00)	74.07	3.41 11.11 3.70 7.41 -
Total	408 (100.00)	60.68	3.92	8.33	13.24	12.26	1.47	108 (100.00)	64.82	12.04 5.56 10.17 7.41 -
2. EASTERN REGION										
(a) Azamgarh	204 (100.00)	31.86	18.63	19.11	18.63	11.28	0.49	54 (100.00)	44.44	9.26 22.22 18.52 5.56 -
(b) Ghazipur	204 (100.00)	45.10	1.96	9.32	34.80	6.37	2.45	54 (100.00)	35.18	9.26 27.78 20.37 7.41 -
Total	408 (100.00)	38.48	10.29	14.22	26.72	8.82	1.47	108 (100.00)	39.82	9.26 25.00 19.44 6.48 -
BOTH THE REGIONS	816 (100.00)	49.63	7.11	11.28	19.98	10.53	1.47	216 (100.00)	52.31	10.65 15.28 14.82 6.94 -



Table 2.4 : Demographic Structure in Sample Households; (Users of Improved and Traditional Chulha)

Region/District	Total Sample Size	Total Population	Male	Female	Average Family Size	Sex Ratio	Percentage of earning members	Percentage of school going children	Percentage of illiterate persons	Per House hold rate
<u>1. CENTRAL REGION</u>										
(a) Lucknow	258	829	712	1541	5.97	859	26.54	1.59	54.77	52.69 3.15
(b) Barabanki	258	882	692	1574	6.10	785	27.83	1.70	51.89	49.49 3.02
(c) Total	516	1711	1404	3115	6.04	821	27.19	1.64	53.42	51.08 3.08
<u>2. EASTERN REGION</u>										
(a) Azamgarh	258	1073	981	2054	7.96	914	21.56	1.72	78.01	38.65 3.08
(b) Ghazipur	258	967	867	1834	7.12	897	21.15	1.50	93.71	25.35 1.80
Total	516	2040	1848	3888	7.54	906	21.37	1.61	81.36	32.38 2.44
BOTH THE REGIONS	1032	3751	3252	7003	6.79	867	23.96	1.63	68.87	40.70 2.76

Table 2.5 : Housing Structure in the Sample Households

Region/District	Households having improved chulha				Households having traditional chulha			
	Sample size	Type of House		No. of house-holds having separate kitchen	Sample size	Type of House		No. of Household having separate kitchen
		Kuchha	Pucca			Kuchha	Pucca	
<b>1. CENTRAL REGION</b>								
(a) Lucknow	204 (100.00)	160 (78.43)	30 (14.71)	14 (6.86)	21 (10.29)	54 (100.00)	48 (88.89)	6 (11.11)
(b) Barabanki	204 (100.00)	135 (66.18)	67 (32.84)	2 (0.98)	17 (8.33)	54 (100.00)	28 (51.85)	4 (7.41)
Total	408 (100.00)	295 (73.20)	97 (23.77)	16 (3.96)	38 (9.31)	108 (100.00)	76 (70.37)	4 (3.70)
<b>2. EASTERN REGION</b>								
(a) Azamgarh	204 (100.00)	114 (55.88)	69 (33.83)	21 (10.29)	27 (13.23)	54 (100.00)	33 (61.11)	15 (27.78)
(b) Ghazipur	204 (100.00)	111 (54.41)	81 (39.71)	12 (5.88)	17 (8.33)	54 (100.00)	34 (62.96)	14 (25.93)
Total	408 (100.00)	225 (55.15)	150 (36.77)	33 (8.08)	44 (10.78)	108 (100.00)	67 (62.04)	29 (26.85)
BOTH THE REGIONS	816 (100.00)	520 (63.73)	247 (30.27)	49 (6.00)	82 (10.05)	216 (100.00)	143 (66.20)	57 (26.39)

Note : Figures in brackets are the percentages to the total sample of respective districts and regions.

**Table 2.6 : Pattern of Infrastructural Facilities in the Sample Households.**

Region/District	Households having Improved Chulha				Households having Traditional Chulha			
	Sample size	Per house- holds No. of rooms	Per- tage of HH electri- having fied HH	% of HH having Bath LatrineRoom	Sample size	Per HH No. of Rooms	% of HH having electrified Latrine HH	% of HH having Bathroom
<b>1. CENTRAL REGION</b>								
(a) Lucknow	204	2.60	-	1.47	4.41	54	2.37	1.85
(b) Barabanki	204	2.65	5.88	8.82	7.35	54	2.59	-
Total	408	2.63	2.94	5.51	5.88	108	2.48	0.93
<b>2. EASTERN REGION</b>								
(a) Azamgarh	204	2.77	2.45	1.47	0.98	54	2.59	3.70
(b) Ghazipur	204	3.22	0.49	1.96	0.49	54	2.57	1.85
Total	408	2.99	1.47	1.72	0.74	108	2.58	1.85
BOTH THE REGIONS	816	2.81	2.21	3.43	3.31	216	2.53	1.39



Table 3.1 : Installation of Improved Chulha in the Sample Households by Different Agencies

Region/District	Sample Size	NEDA	LORP	ETC	CBRDA
<b>1. CENTRAL REGION</b>					
(a) Lucknow	204 (100.00)	204 (100.00)	-	-	-
(b) Barabanki	204 (100.00)	136 (66.67)	-	-	68 (33.33)
Total	408 (100.00)	340 (83.33)	-	-	68 (16.67)
<b>2. EASTERN REGION</b>					
(a) Azamgarh	204 (100.00)	-	68 (33.33)	136 (66.67)	-
(b) Ghazipur	204 (100.00)	-	136 (66.67)	68 (33.33)	-
Total	408 (100.00)	-	204 (50.00)	204 (50.00)	-
BOTH THE REGIONS	816 (100.00)	340 (41.67)	204 (25.00)	204 (25.00)	68 (8.33)

Abbreviations: NEDA : Non-Conventional Energy Development Agency, U.P.  
 LORP : Labour Organization for Rural Poor.  
 ETC : Extension Training Centre.  
 CBRDARC : Chandra Bhamu Rural Development Agency and Research Centre.

Note : Figures in brackets denote percentages to total sample.



Table 3.2 : Source of First Hand Information about Improved Chulha to the Users.

Region/District	Sample size	Relatives	Friends	Radio/ T.V.	News- papers	Govt. Offi- cials	Voluntary Organiza- tion	Pra- dhan	Village reputed person
<u>1. CENTRAL REGION</u>									
(a) Lucknow	204	4.41	1.96	0.49	-	52.94	31.37	7.84	0.98
(b) Barabanki	204	3.43	0.98	-	-	27.45	30.39	34.80	2.94
Total	408	3.92	1.47	0.25	-	40.10	30.88	21.32	1.96
<u>2. EASTERN REGION</u>									
(a) Azamgarh	204	0.98	3.93	-	5.88	40.20	35.78	6.86	6.37
(b) Ghazipur	204	-	-	-	-	51.96	48.04	-	-
Total	408	0.49	1.96	-	2.94	46.08	41.91	3.43	3.19
BOTH THE REGIONS	816	2.21	1.72	0.12	1.47	43.14	36.40	12.37	2.57

Note : Percentages are to the sample size.

Table 3.3 : Source of Motivation to Instal Improved Chulha

(Figures in Percentages).						
Region/District	Sample Size	Motivated by				
		Village Govt. Pradhan Employee	Voluntary Organization	Village Money lender	Friends/Relatives	
<u>1. CENTRAL REGION</u>						
(a) Lucknow	204	81.86	13.24	1.47	0.98	2.45
(b) Barabanki	204	98.04	0.49	0.98	-	0.49
Total	408	89.95	6.86	1.23	0.49	1.47
<u>2. EASTERN REGION</u>						
(a) Azamgarh	204	15.20	64.71	10.29	4.90	4.90
(b) Ghazipur	204	0.49	32.84	66.67	-	-
Total	408	7.84	48.77	38.49	2.45	2.45
BOTH THE REGIONS	816	48.90	27.82	19.85	1.47	1.96

Note : Percentages are to the sample size.

Table 3.4 : Condition of Improved Chulha and their Working Pattern

Region/District	Sample size	Changes have been made				No changes have been made				Total	
		Total	Working	Not Working	ing	Total	Working	Not Working	ing	Working	Not Working
<b>1. CENTRAL REGION</b>											
(a) Lucknow	204	100	76 (76.00)	24 (24.00)	-	104	-	104 (100.00)	76 (37.25)	128 (62.75)	
(b) Barabanki	204	105	92 (87.62)	13 (12.38)	-	99	-	99 (100.00)	92 (45.10)	112 (54.90)	
Total	408	205	168 (81.95)	37 (18.05)	-	203	-	203 (100.00)	168 (41.18)	240 (58.82)	
<b>2. EASTERN REGION</b>											
(a) Azamgarh	204	107	107 (100.00)	-	7 (7.22)	97	90 (92.78)	90 (92.78)	114 (55.88)	90 (44.12)	
(b) Ghazipur	204	62	62 (100.00)	-	88 (61.97)	142	54 (38.03)	54 (38.03)	150 (73.53)	54 (26.47)	
Total	408	169	169 (100.00)	-	95 (39.75)	239	144 (60.25)	144 (60.25)	264 (64.71)	144 (35.29)	
BOTH THE REGIONS	816	374	337 (90.11)	37 (9.89)	95 (21.49)	442	347 (78.50)	347 (78.50)	432 (52.94)	384 (47.06)	

Note : Figures in brackets denote percentages

Table 3.5 : Working Condition of the Improved Chulhas in the Households of Different Social Groups

Caste	CENTRAL REGION			EASTERN REGION			BOTH THE REGIONS		
	Sample size	No. of Chulha not Wor-king	% of Chulha not Wor-king	Sample size	No. of Chulha not wor-king	% of Chulha not wor-king	Sample size	No. of Chulha not wor-king	% of Chulha not wor-king
1. General Caste	62	32	51.61	150	45	30.00	212	77	36.32
2. SC/ST	183	113	61.75	131	55	41.94	314	168	53.50
3. Backward	122	64	52.46	89	26	29.21	211	90	42.65
4. Muslim	41	31	75.61	38	18	47.39	79	49	62.02
Total	408	240	58.82	408	144	35.29	816	384	47.06



Table 3.6 : Agencywise Reasons for Not Working/Using Improved Chulha

Agency/Region	Sample size	No. of Chulha not working	REASONS FOR NOT WORKING								Fear of Repairing Pro-accident.
			Takes more fuel	Handling problem	Smoke not eliminated	Takes more time	Not compatible	Wrong placement	Out of order	blem	
1. CENTRAL REGION	408	240	80.83	12.50	23.33	35.83	39.17	8.75	12.92	2.08	1.67
(a) NEDA	340	218	82.56	13.20	22.48	36.70	39.45	8.72	12.39	2.29	1.83
(b) CBRDA	68	22	63.64	4.35	31.82	27.27	36.36	9.09	18.18	-	-
2. EASTERN REGION	408	144	39.58	15.28	22.92	18.06	28.47	22.22	15.97	14.58	4.86
(a) LORP	204	40	35.00	10.00	35.00	17.50	12.50	7.50	15.00	15.00	5.00
(b) ETC	204	104	41.35	17.31	18.27	18.27	34.62	27.89	16.35	14.42	4.81
BOTH THE REGIONS	816	384	63.37	13.54	23.18	29.17	35.16	13.80	14.06	6.77	2.86

NOTE : 1. Figures are percentages to number of chulhas not working/being used in the respective regions installed by different agencies.

2. Responses are multiple regarding reasons for not working.

**Table 3.5 (A) : Performance of Improved Chulha Installed During Different Years in the Sample Households**

Year of Installation	No. of improved shulhas in the sample	No. of Chulhas which were in working order	No. of Chulhas No. of which were not in working order	No. of Chulhas in which changes had been made
1985	138	50 (36.23)	88 (63.77)	50 (36.23)
1986	627	340 (54.23)	287 (45.77)	355 (56.62)
1987 (Upto March)	51	42 (82.35)	9 (17.65)	37 (72.55)
TOTAL	816	432 (52.94)	384 (47.06)	442 (54.17)

Note : (i) Figures in brackets are percentages to the total sample.

(ii) The survey was conducted during last week of March 1987 to May 1987.

Table 3.5 (B) : Districtwise Performance of Improved Chulhas Installed in Different Years

Year of Installation	Lucknow		BARABANKI		Azamgarh		Ghazipur		TOTAL	
	No. of working chulhas	No. of Chulhas not working	No. of working chulhas	No. of Chulhas not working	No. of working chulhas	No. of Chulhas not working	No. of working chulhas	No. of Chulhas not working	No. of Working Chulhas	No. of Chulhas not working
1985	20	46	5	9	18	28	7	5	50	88
1986	53	80	84	102	92	61	111	44	340	287
1987 (Upto March)	3	2	3	1	4	1	32	5	42	9
TOTAL	76	128	92	112	114	90	150	54	432	384

Table 3.7 : Reasons for Not Working or Being Used the Improved Chulha in the Sample Households.

REGION/DISTRICT	Sample size	No. of Chulha not working/being used	REASONS FOR NOT WORKING/BEING USED (Figures in Percentages)							
			Takes more fuel	Handling problem	Smoke not eliminated	Taking More time	Not Compatible	Wrong placement	Out of order	Fear of Repairing problem
<b>1. CENTRAL REGION</b>										
a) Lucknow	204	128	78.91	14.84	17.19	34.38	46.09	8.59	3.91	1.56
b) Barabanki	204	112	83.04	9.82	30.36	37.50	31.25	8.93	23.21	1.79
Total	408	240	80.83	12.50	23.33	35.83	39.17	8.75	12.92	1.67
<b>2. EASTERN REGION</b>										
a) Azamgarh	204	90	34.44	21.11	26.67	14.44	34.44	25.55	20.00	14.44
b) Ghazipur	204	64	48.14	5.56	16.67	24.07	18.52	16.67	9.26	14.82
Total	408	144	39.58	15.29	22.92	18.06	28.47	22.22	15.97	14.58
BOTH THE REGIONS	816	384	65.37	13.54	23.18	29.17	35.16	13.80	14.06	6.77
										2.87

NOTE: Percentages are to total number of not working chulhas.





Table 3.9 : Major Changes have been made in the Improved Chulhas by the Sample Households

REGION/DISTRICT	Sample size of improved chulhas	No. of HH made changes	Nature of changes made in Improved Chulhas (Figures in Percentage)				
			Chimney Shortened	Chimney removed	Dampers removed	Pot Hole size changed	Feeding chamber removed
1. CENTRAL REGION							
a) Lucknow	204	100	16.00	26.00	24.00	53.00	25.00
b) Barabanki	204	105	11.43	40.95	21.91	36.19	17.15
TOTAL	408	205	13.66	33.66	22.92	44.39	20.97
2. EASTERN REGION							
a) Azamgarh	204	107	15.89	24.29	57.94	44.86	2.80
b) Ghazipur	204	62	3.23	3.23	40.00	30.65	20.97
Total	408	169	11.24	16.57	51.48	39.65	9.47
BOTH THE REGIONS	816	374	12.57	25.94	35.83	42.25	15.77
							11.23

NOTE : Figures in percentages are to the number of households made changes.

Table 3.10 : Pattern of Major Changes in the Improved Chulhas Installed by Different Agencies

Name of Agency which installed improved chulhas	Sample size of the Improved Chulhas	No. of HH who made changes in the Chulhas	Nature of Changes in Improved Chulha (Figures are in Percentages)					
			Chimney short-ened	Chimney removed	Damper removed	Pot hole feeding size ch-anged	Feeding chamber changed	Baffle removed
1. N.E.D.A.	340	186	13.44	36.02	21.50	45.16	18.81	13.44
2. C.B. R.D.A.	68	19	15.78	10.52	36.84	36.84	42.10	5.26
3. L.O.R.P.	204	87	5.74	16.09	51.72	33.33	12.64	4.59
4. E.T.C.	204	82	17.07	17.07	51.21	46.34	6.09	14.63
TOTAL	816	374	12.57	25.94	35.83	42.25	15.77	11.23

NOTE: The Decimal figures are the percentages to the No. of Households who made changes. There were several chulhas in which more than one change had been made.

Abbreviations:

1. N.E. D.A. : Non-Conventional Energy Development Agency  
 2. C.B.R.D. A. : Chandra Bhanu Rural Development Agency  
 3. L.O.R.P. : Labour Organization of Rural Poor  
 4. E.T. C. : Extension Training Centre.

Table 3.11 : Educationwise Major Changes have been made in Improved Chulha

Education Level of Head of Households	Sample size	No. of HH who had made changes	Nature of Changes (Figures in Percentages)						
			Chimney Shortened	Chimney removed	Damper removed	Pot size changed	Hole widened	Baffle removed	Feeding chamber removed
1. Illiterate	337	156	14.10	23.08	39.74	42.31	5.13	14.74	15.39
2. Primary	168	80	7.50	36.25	31.25	51.25	-	7.50	5.00
3. Jr. High School	123	55	18.18	34.54	16.36	40.00	1.81	9.09	7.27
4. High School	91	39	10.26	25.64	46.15	35.90	-	5.13	15.39
5. Intermediate	49	23	8.69	4.35	52.17	21.74	4.35	17.39	30.43
6. Graduate & Above	48	21	14.29	9.52	38.09	47.62	4.76	9.52	14.29
Total	816	374	12.57	25.94	35.83	42.25	2.94	11.22	12.83

NOTE : Percentages are to the number of households made changes in improved chulha.



Table 3.12 : Family Size of the Households and Changes made in their Improved Chulhas

Family Groups (Number of persons)	Sample size	No. of HH made Changes	Nature of Changes (Figures in Percentages)						
			Chimney Short- ened	Chimney removed	Damper changed widened	Pot Hole feeding chamber removed	Place of feeding chamber removed		
1. Upto 3	124	61	14.75	32.79	27.87	37.71	1.64	16.39	16.39
2. 4 - 6	310	150	8.67	31.33	36.00	39.33	3.33	14.00	12.00
3. 7 - 9	236	108	13.88	19.44	36.11	43.52	4.63	9.26	12.96
4. 10 and above	146	55	18.18	16.36	43.64	52.73	-	1.82	10.91
Total	816	374	12.57	25.94	35.83	42.25	2.94	11.22	12.83

NOTE: Percentages are to the total number of households made changes in improved chulhas.

Table 3.13 : Level of Instructions given to the Users and the Performance of their Chulhas

REGION/DISTRICT	Sample size of HH with Improved Chulha	No. of HH who had been given instruction HH who had been given instructions	No. of Work-ing Chulhas who had not been in-structionsnot been gi-ven instructions	No. of HH No. of work-ing Chulhas among those HH who had actually	Total No. of Chulhas which were
<u>1. CENTRAL REGION</u>					
a) Lucknow	204	102	44	102	32 76
b) Barabanki	204	88	52	116	40 92
Total	408	190	96	218	72 168
<u>2. EASTERN REGION</u>					
a) Azamgarh	204	100	65	104	49 114
b) Ghazipur	204	192	145	12	5 150
Total	408	292	210	116	54 264
BOTH THE REGIONS	816	482	306	334	126 432

Table 3.14 : Level of Instructions given to the users according to different  
Installing Agencies

Installing Agency	Sample size of HH with Improved chulhas	No. of HH who had been given instructions	No. of work- ing chulhas among those HH who had been given instructions	No. of HH who had not been given in- structions	No. of work- ing chulhas among those HH who had not been gi- ven instructions	Total No. of chulhas which were actually working
1. N.E.D.A.	340	161 (47.35)	75 (46.58)	179	47 (26.25)	122
2. C. B.R. D.A.	68	28 (42.64)	18 (62.06)	39	28 (71.79)	46
3. L.O.R.P.	204	164 (80.39)	144 (87.80)	40	20 (50.00)	164
4. E.T.C.	204	128 (62.74)	69 (53.90)	76	31 (40.78)	100
TOTAL	816	482 (59.06)	306 (63.48)	334	126 (37.72)	432

Table 3.15 : Advantages of Improved Chulhas as viewed by the Users.

REGION/DISTRICT	Sample size of HH with Improved Chulhas	No. of HH actually using improved chulhas	Take less fuel than past in traditional chulha	Takes less time in cooking	less more heat generates at a time	Cooking of more dishes at a time	No or less smoke disease in cleaning utensils	Less time & efforts in traditional chulha	Safer than
<b>1. CENTRAL REGION</b>									
a) Lucknow	204	76	98.66	97.36	76.32	88.16	92.11	64.46	55.26
b) Barabanki	204	92	89.13	100.00	73.91	100.00	100.00	100.00	18.48
Total	408	168	93.45	98.81	75.00	94.64	96.43	83.93	35.12
<b>2. EASTERN REGION</b>									
a) Azamgarh	204	114	89.47	96.49	79.82	78.95	48.25	53.51	57.90
b) Ghazipur	204	150	98.00	91.33	84.67	91.33	100.00	99.33	6.00
Total	408	264	95.07	93.56	82.58	85.98	77.65	79.55	28.41
BOTH THE REGIONS	816	432	94.44	95.60	79.63	89.35	84.95	81.25	31.02

NOTE : Figures are percentages to the total number of households actually using improved chulha.



Table 3.16 : Advantages of Improved Chulhas in terms of fuel and time saving in Cooking Process

REGION/DISTRICT	Sample size No. of HH with Improved chulhas	No. of HH actually using improved chulhas	(Figures in Percentages)				
			Takes Less Fuel Than Past	Taking Less time in cooking than past			
<u>1. CENTRAL REGION</u>							
a) Lucknow	204	76	18.42	35.53	44.74	32.89	28.95
b) Barabanki	204	92	43.48	26.09	19.57	60.67	16.30
Total	408	168	32.14	30.36	30.95	48.21	22.62
<u>2. EASTERN REGION</u>							
a) Azamgarh	204	114	14.43	49.12	22.81	50.00	13.16
b) Ghazipur	204	150	0.67	69.33	29.33	-	52.00
Total	408	264	8.33	60.61	26.51	21.59	35.22
BOTH THE REGIONS	816	432	17.59	48.84	28.24	31.94	30.09

Table 4.1 : Awareness about Improved Chulha Among the Users of Traditional Chulha and the Source of First Hand Information About Improved Chulha

REGION/DISTRICT	No. of HH Sample who were size aware ab- out Impro- ved Chulha	Sources of First Hand Information				
		Relative Pradhan Radio/ T. V.	Friends News- papers	Voluntary Organiza- tion	Govt. Offi- cial	
<b>1. CENTRAL REGION</b>						
a) Lucknow	54 (68.52)	7 (18.92)	3 (8.11)	2 (5.41)	8 (21.62)	10 (27.03)
b) Barabanki	54 (61.11)	-	-	-	22 (66.67)	11 (33.33)
Total	108 (64.82)	7 (10.00)	3 (4.29)	2 (2.86)	8 (11.43)	32 (45.71)
<b>2. EASTERN REGION</b>						
a) Azamgarh	54 (81.48)	3 (6.82)	5 (11.36)	3 (6.82)	1 (2.27)	20 (45.46)
b) Ghazipur	54 (100.00)	-	-	-	34 (62.96)	20 (37.04)
Total	108 (90.75)	3 (5.06)	5 (5.10)	3 (3.06)	1 (1.02)	54 (55.10)
BOTH THE REGION	216 (77.78)	10 (5.95)	8 (4.76)	5 (2.98)	9 (5.36)	86 (51.19)

NOTE : Figures in brackets denote percentages to sample size.

NOTE : Figures in brackets denote percentages to sample size.

Table 4.2 : Reasons for not Installing Improved Chulhas as Viewed by Users of Traditional Chulhas.

REGION/DISTRICT	Sample size of Traditional chulhas	Reasons for not installing Improved Chulhas (Figures are % to the Sample)									
		Not aware about improved chulha	Depend on im-proved chulha	Space or Ke-rosene Oil or Gas	Male member apathy particular dishes	Not suitable for particular dishes	Fear Women are apprehensive	Super-stition	Breakage problem	Impucca houses	
1. CENTRAL REGION											
a) Lucknow	54	31.48	3.70	14.81	7.40	7.40	7.40	1.85	18.51		
b) Barabanki	54	38.88	14.81	9.25	1.85	3.70	5.55	11.11	3.70	11.11	
Total	108	35.18	9.25	12.03	13.15	5.55	6.48	9.25	2.77	14.81	
2. EASTERN REGION											
a) Azamgarh	54	18.51	-	14.81	3.70	9.25	11.11	11.11	7.40	24.07	
b) Ghazipur	54	-	1.85	37.03	7.40	11.11	5.55	14.81	3.70	18.51	
Total	108	9.25	0.92	25.92	5.55	10.18	8.33	12.96	5.55	21.29	
BOTH THE REGIONS	216	20.83	5.09	18.98	5.09	7.87	7.40	11.11	4.16	18.05	

Table 4.3 : Households Interested to instal Improved Chulha

REGION/DISTRICT	Sample size	No. of HH interested to instal improved Chulha	Reasons for interested to instal Chulha (Figures are % to the HH interested)	Improved
			Less efforts Time Saving Fuel Saving Less Smoke in cleaning utensils	
<b>1. CENTRAL REGION</b>				
a) Lucknow	54	38	70.00	77.50
b) Barabanki	54	32	50.00	64.71
Total	108	70	60.81	71.62
<b>2. EASTERN REGION</b>				
a) Azamgarh	54	36	90.91	84.85
b) Ghazipur	54	44	45.46	72.73
Total	108	80	64.94	77.92
BOTH THE REGIONS	216	150	62.91	71.52
				72.85
				84.42
				80.13

87.88  
81.82



Table 4.4 : Reasons for not Approaching any one for the Installation of Improved Chulha

REGION/DISTRICT	Sample size	No. of HH not approaching to any one	Reasons for Not Approaching (Figures in %)				
			HH not interested at all to install Improved Chulha	Lack of proper knowledge about the installing agency	Space problem in pucca houses	Fear of taxes in future dates	
<u>1. CENTRAL REGION</u>							
a) Lucknow	54	36	22.22	75.00	22.22	27.78	11.11
b) Barabanki	54	38	33.33	69.44	13.89	12.96	16.67
Total	108	74	29.79	74.22	19.06	21.30	15.89
<u>2. EASTERN REGION</u>							
a) Azamgarh	54	18	27.79	83.33	44.44	29.63	16.67
b) Ghazipur	54	27	14.82	66.67	74.07	14.81	7.41
Total	108	45	20.00	73.33	62.22	22.22	11.11
BOTH THE REGIONS	216	119	25.79	73.65	36.84	21.76	12.82

Table 4.5 : Per Day Time Spent on Collection of Fuel and Cooking of Meal  
(Traditional Chulha)

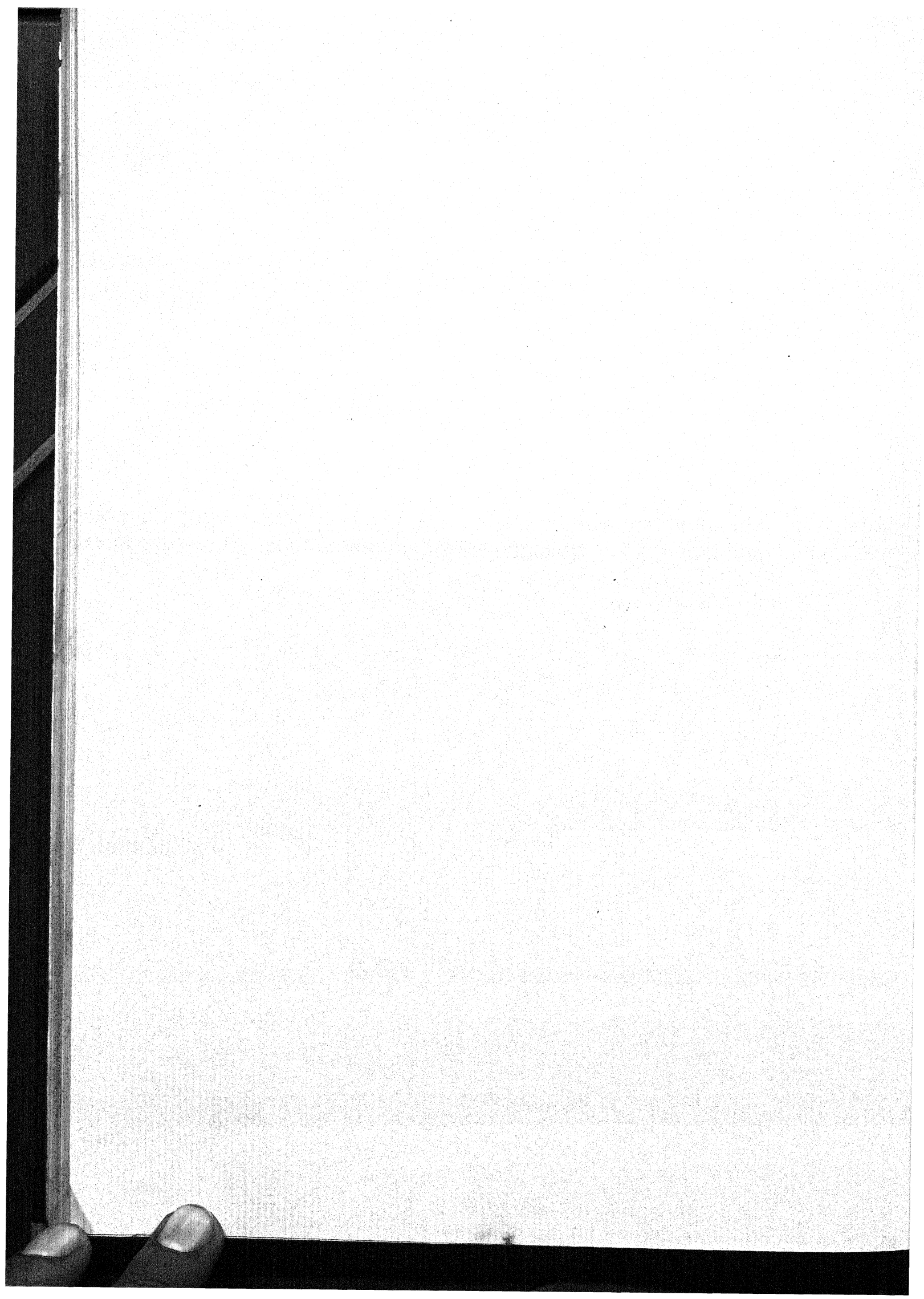
REGION/DISTRICT	Sample size of the Tra- ditional Chulhas	Time Spent on Collection of Fuel (Hrs.)		Time Spent on Cooking (Hrs.)	
		Per Family Per Day	Per Capita Per Day	Per Family Per Day	Per Capita Per Day
<u>1. CENTRAL REGION</u>					
a) Lucknow	54	3.11	0.56	2.72	0.49
b) Barabanki	54	1.55	0.25	2.53	0.41
Total	108	2.33	0.40	2.62	0.45
<u>2. EASTERN REGION</u>					
a) Azamgarh	54	1.68	0.19	3.05	0.34
b) Ghazipur	54	2.46	0.37	3.35	0.51
Total	108	2.07	0.27	3.20	0.41
BOTH THE REGIONS	216	2.20	0.32	2.92	0.43

Table 4.6 : Per Day Time Spent on Collection of Fuel and Cooking of Meal According to Family Size (Traditional Chulha)

Family Size (In Numbers)	Sample Size of Traditional Chulha	Per Family Per Day Time Spent on coll- ection of Cooking Fuel (Hrs.)	Per Family Per Day Time Spent on Cook- ing (Hrs.)
Upto 3	47	2.45	2.14
4 - 6	88	2.22	2.86
7 - 8	42	2.10	3.14
9 - 10	13	2.08	3.46
Above 10	26	1.96	3.92
Total	216	2.20	2.92

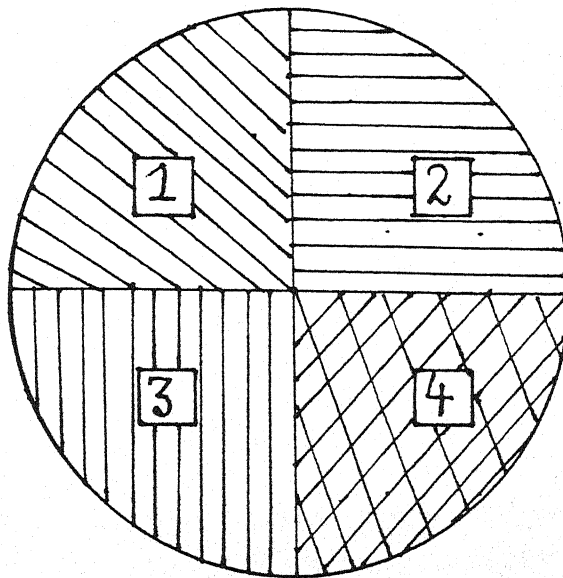
APPENDIX  
( CHARTS AND DIAGRAMS )





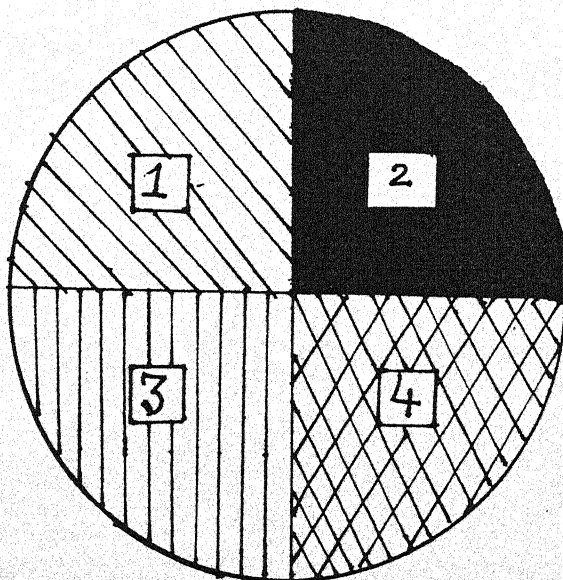
APPENDIX-I

Districtwise Distribution of Sample Households  
(users of Improved chulha)



1	Lucknow - 204
2	Barabanki - 204
3	Azamgarh - 204
4	Ghazipur - 204

Districtwise Distribution of Sample Households  
(Users of Traditional chulha)

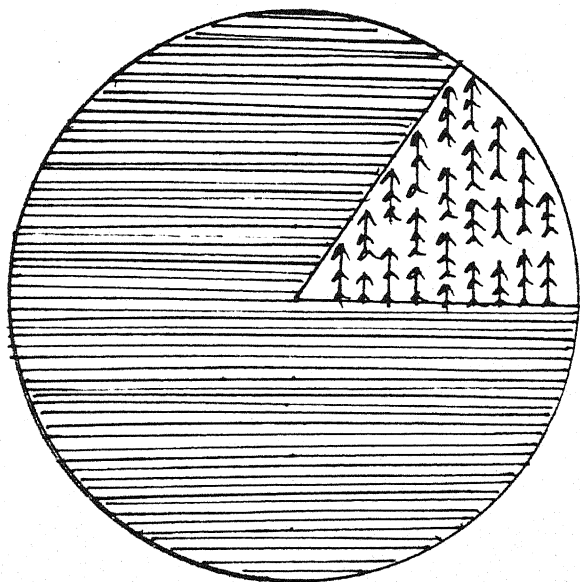


1	Lucknow - 54
2	Barabanki - 54
3	Azamgarh - 54
4	Ghazipur - 54



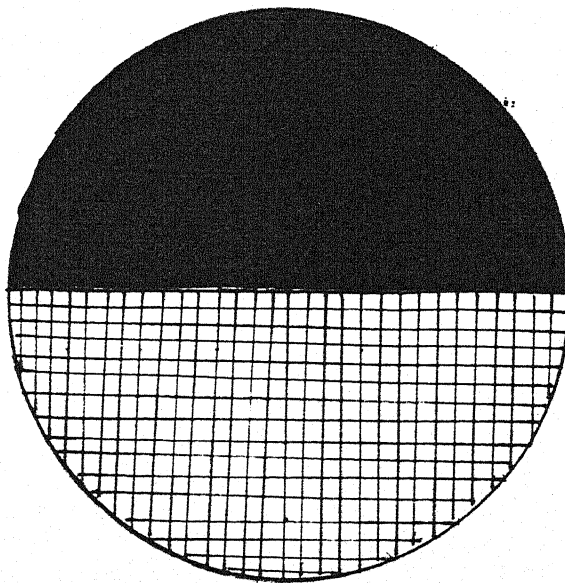
APPENDIX- II

Improved Chulhas Installed By Different Agencies In The Sample Households.



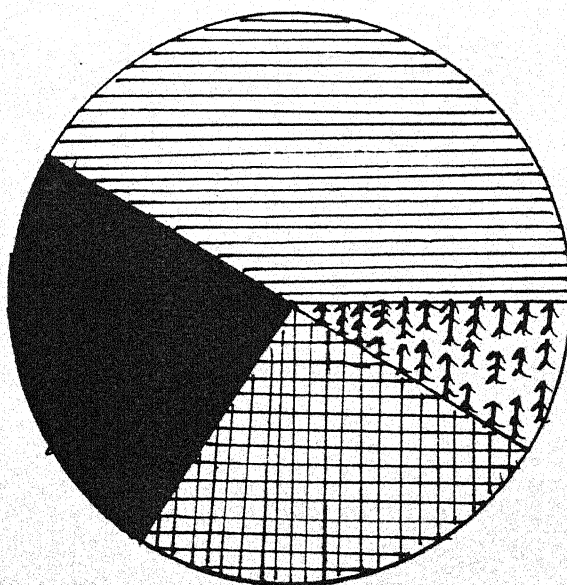
Central Region of U.P.

	CBRDA	68
	NEDA	340



Eastern Region of U.P.

	LORP	204
	ETC	204



Both The Regions

	CBRDA	68
	NEDA	340

	LORP	204
	ETC	204



350

300

250

200

150

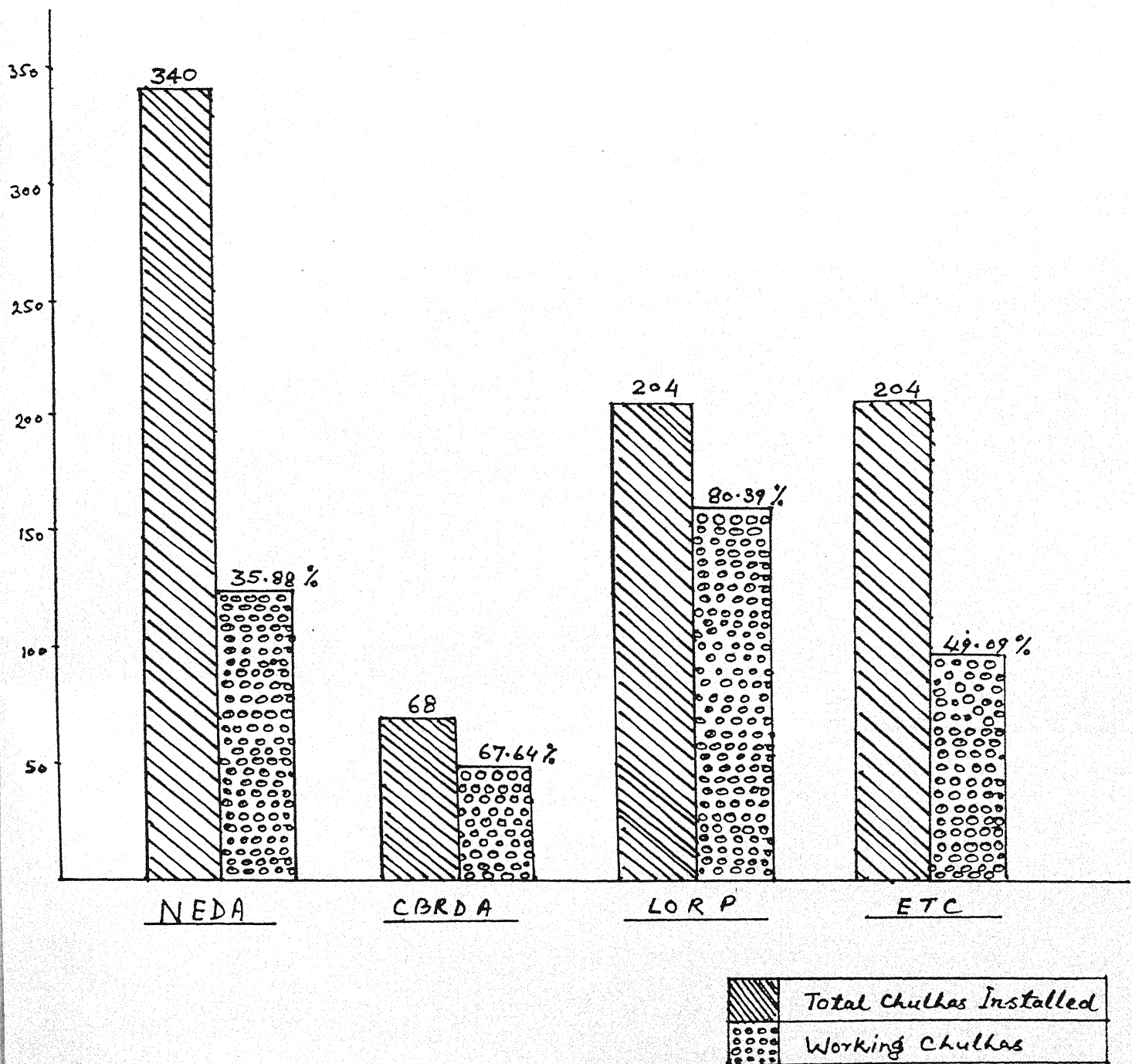
100

50



APPENDIX - III

Agencywise Distribution of Installed and The Working Chulhas

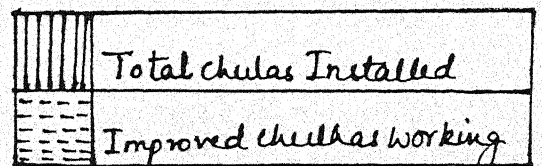
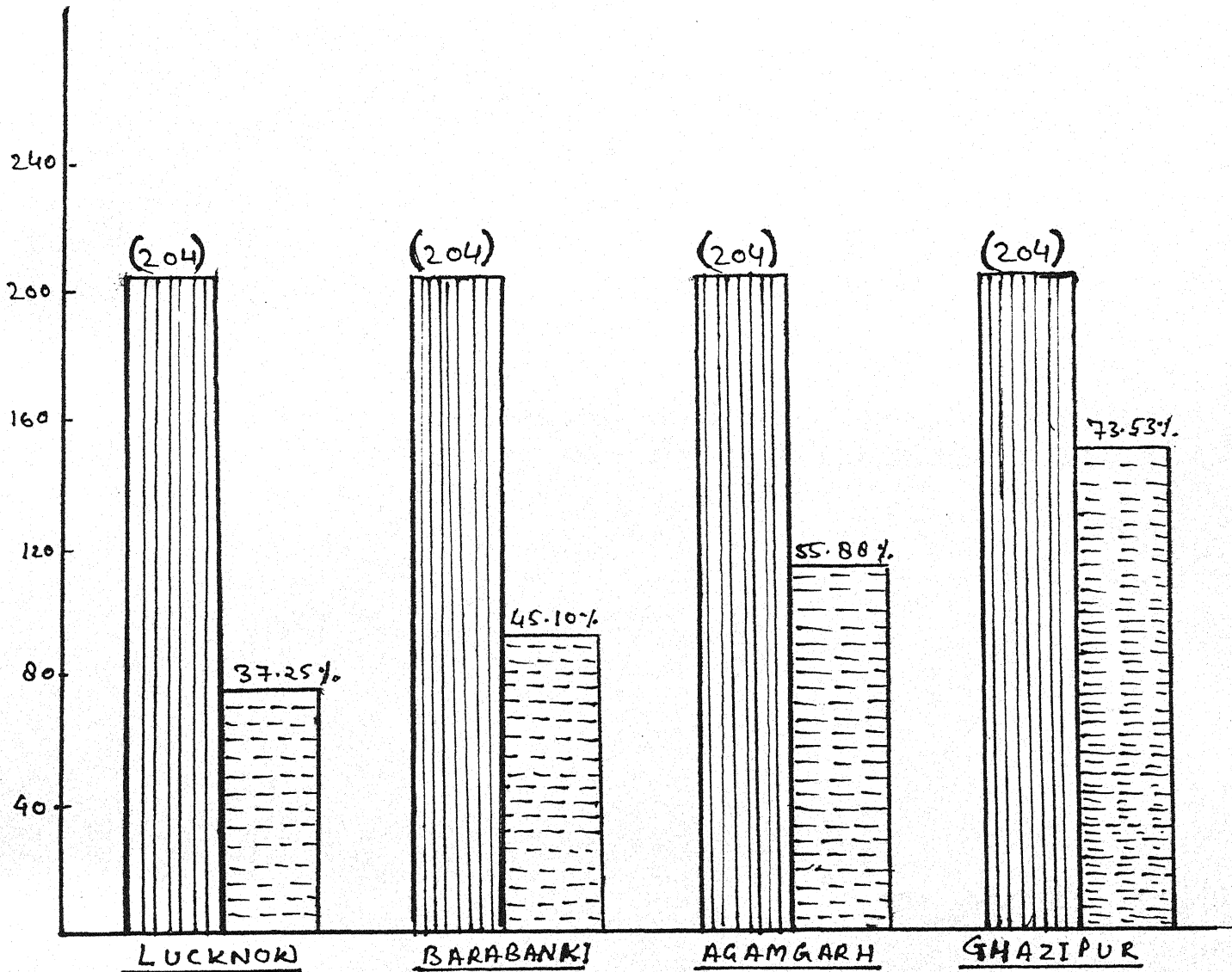






APPENDIX-V

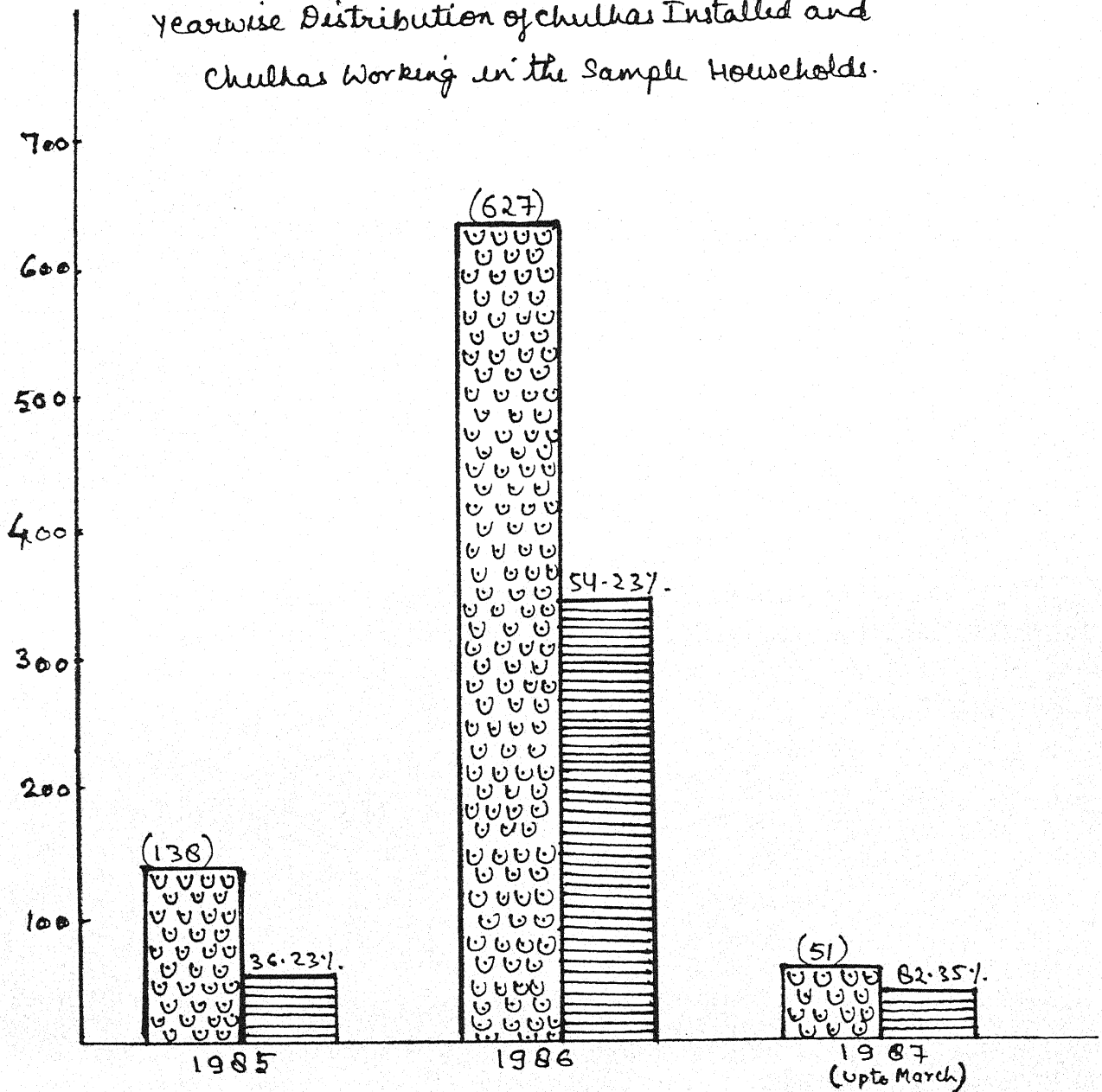
*Districtwise Distribution of Installed and working chulhas  
in the sample Households.*





APPENDIX-V

Yearwise Distribution of Chulhas Installed and  
Chulhas Working in the Sample Households.



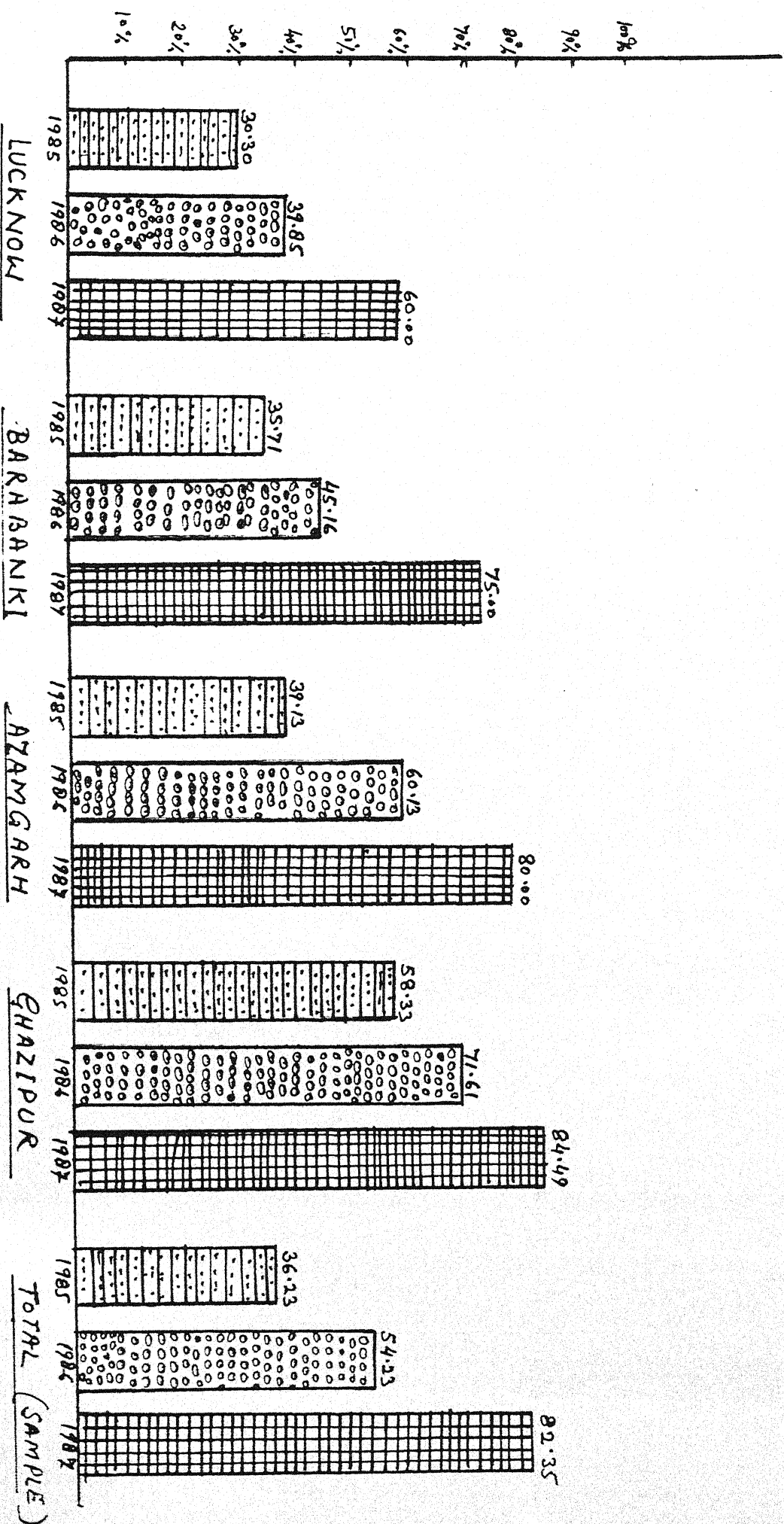
UUUU	Total Chulhas Installed
	Working Chulhas





APPENDIX - VI

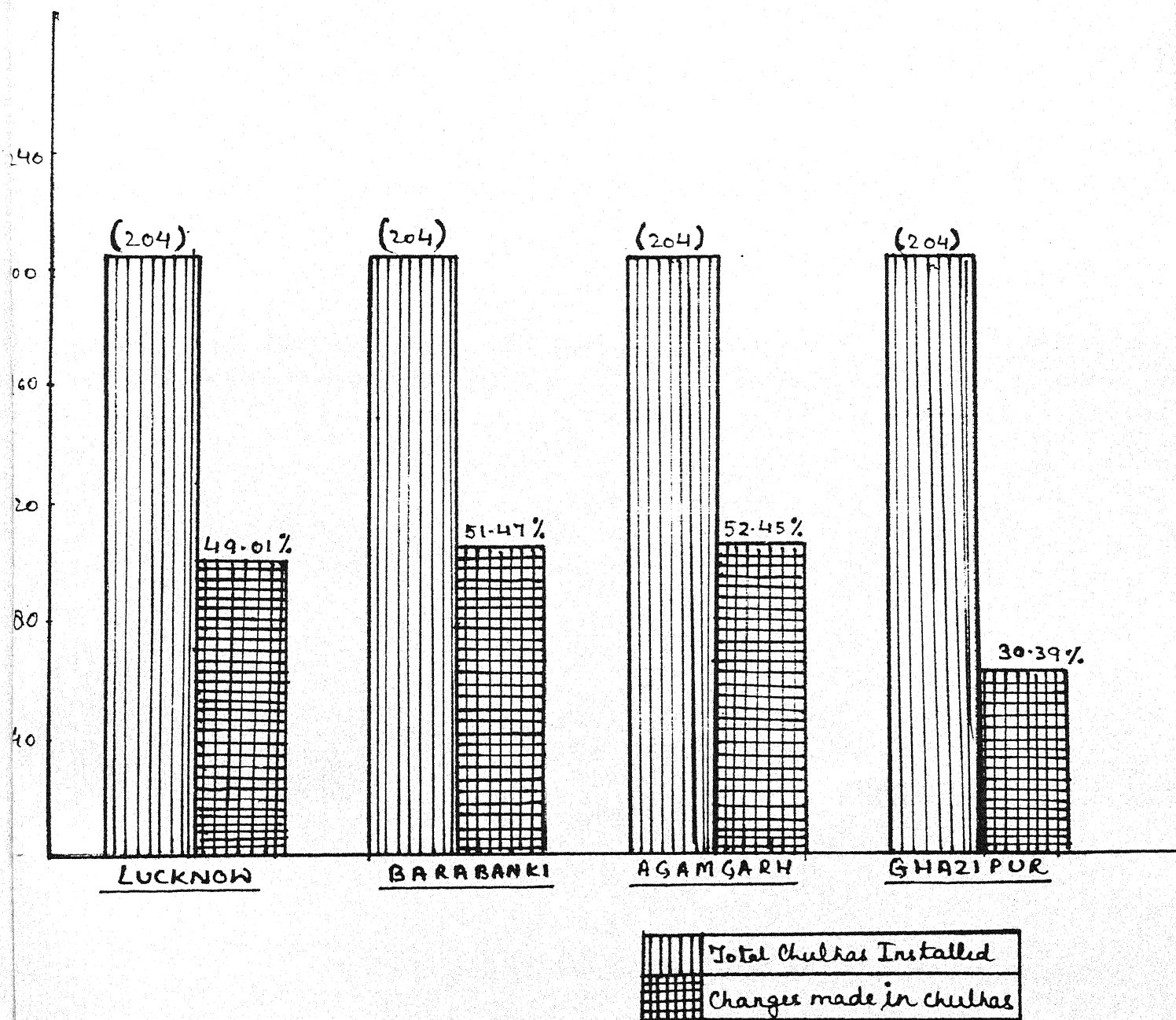
Percentage of Working Cullas Among Cullas Installed in different years





APPENDIX-VII

*District wise Distribution of Installed Chulhas and Charges made On Them*

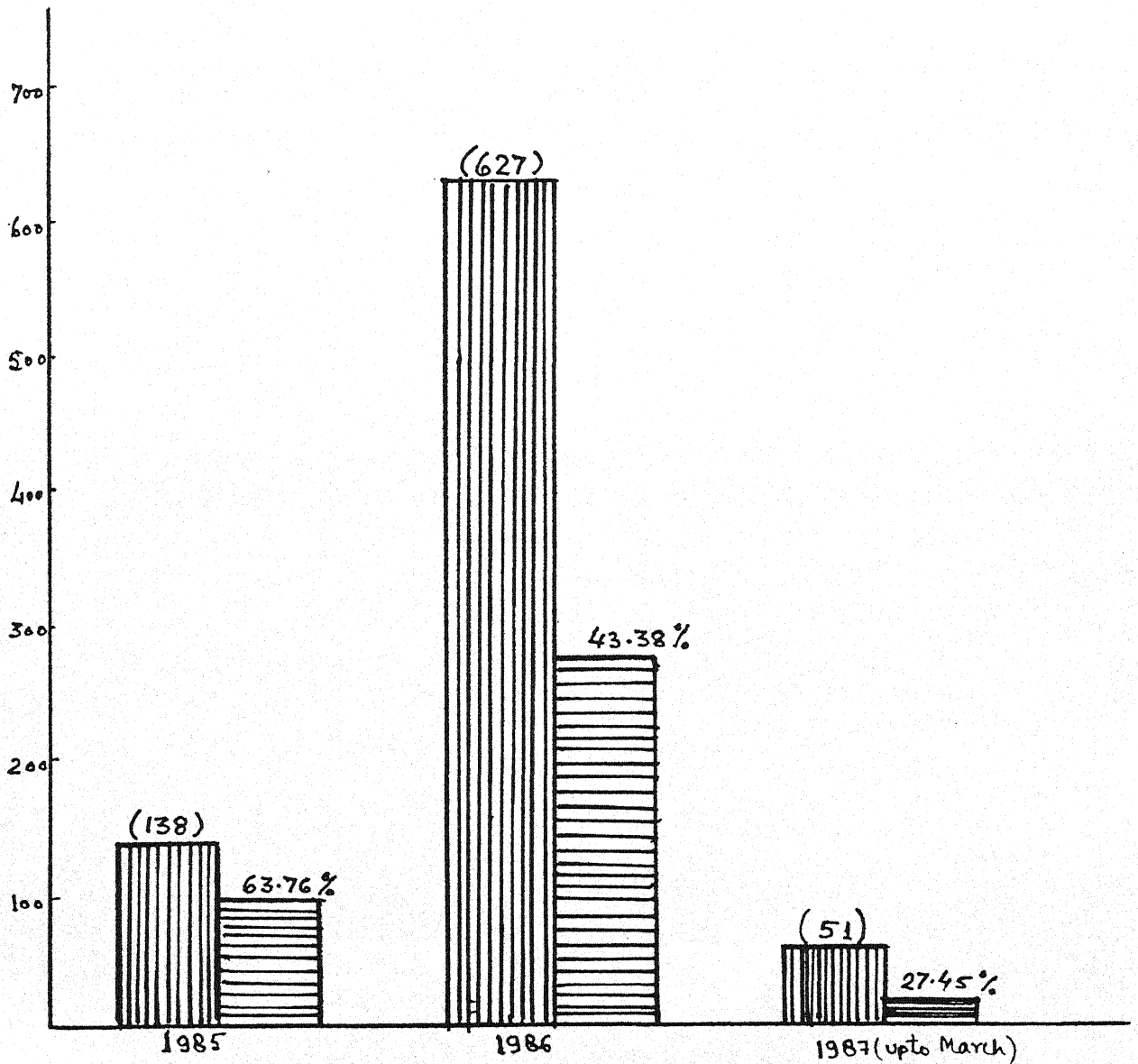








APPENDIX - VIII

Chulhas Installed IN Different Years and Changes Made on them.

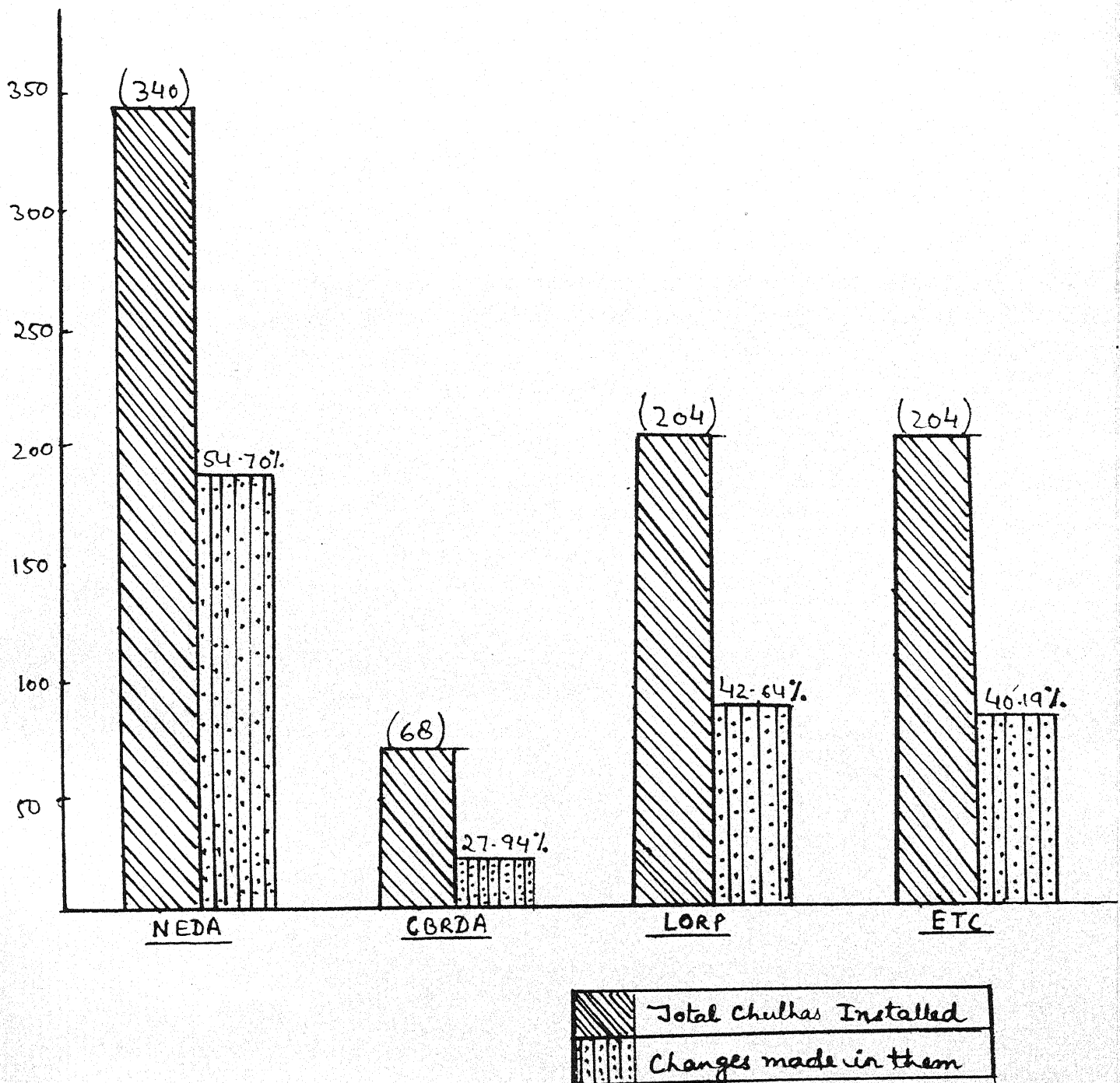


	Total Chulhas Installed
	Changes made in the Chulhas



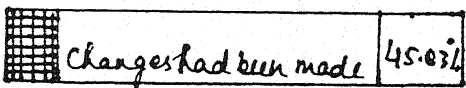
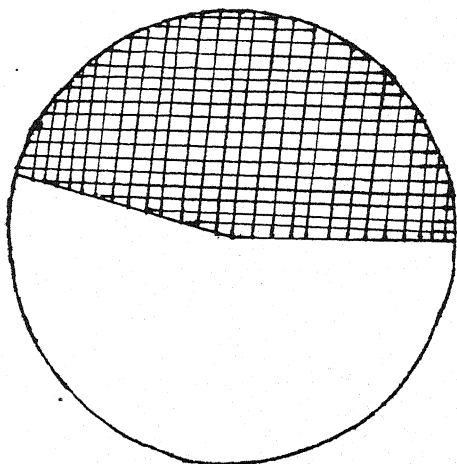
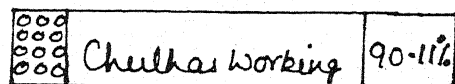
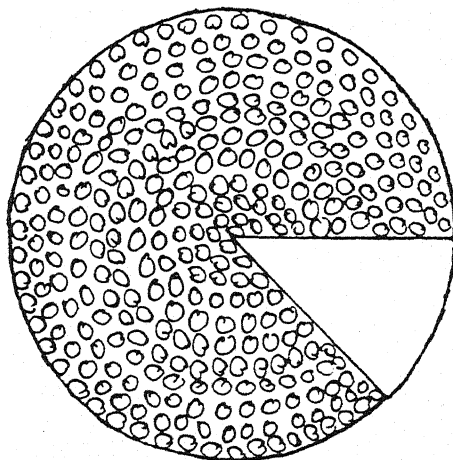
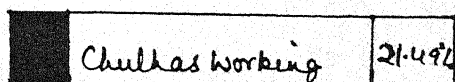
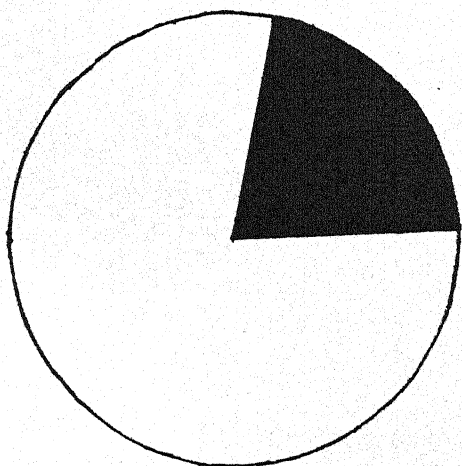
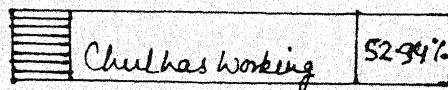
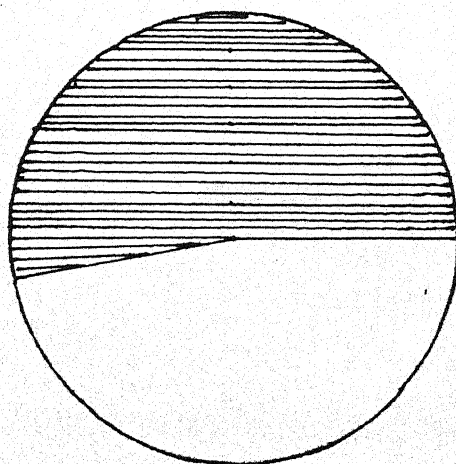
APPENDIX - IX

Agencywise Distribution Of Chulhas Installed And Changes Made In Them





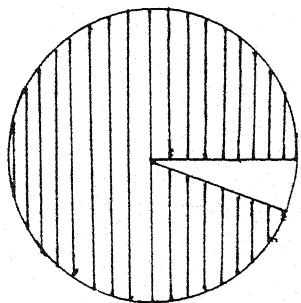


APPENDIX - XCharges made on  
Installed ChulhasChulhas working among  
which changes were madeChulhas working among  
which no changes were madeChulhas working among  
the total Installed chulhas

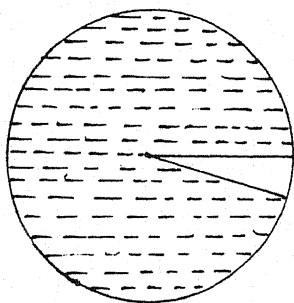


APPENDIX - XI

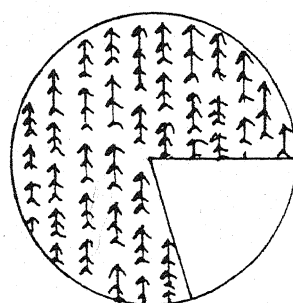
Advantages Of Improved Chulha As Viewed By The Users  
(Number of Users reporting the advantage)



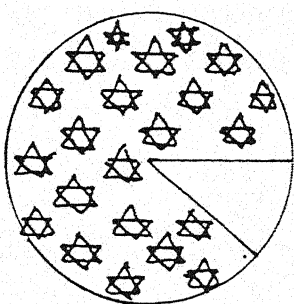
||||| Takes less fuel



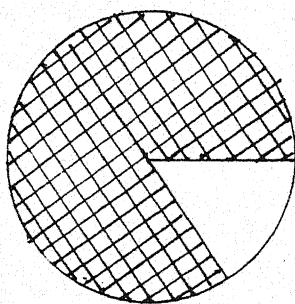
----- Takes less time in cooking



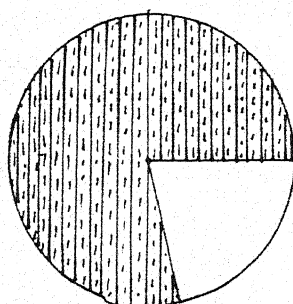
↑↑↑ More Heat generated



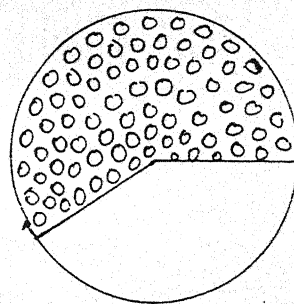
☆☆☆ Cooking of more dishes



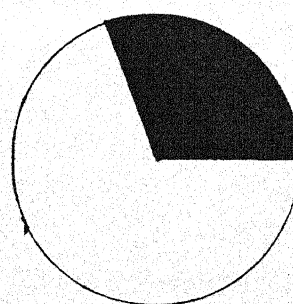
||||| Less Smoke



||||| Less Eye diseases



ooo Less efforts require in cleaning utensils



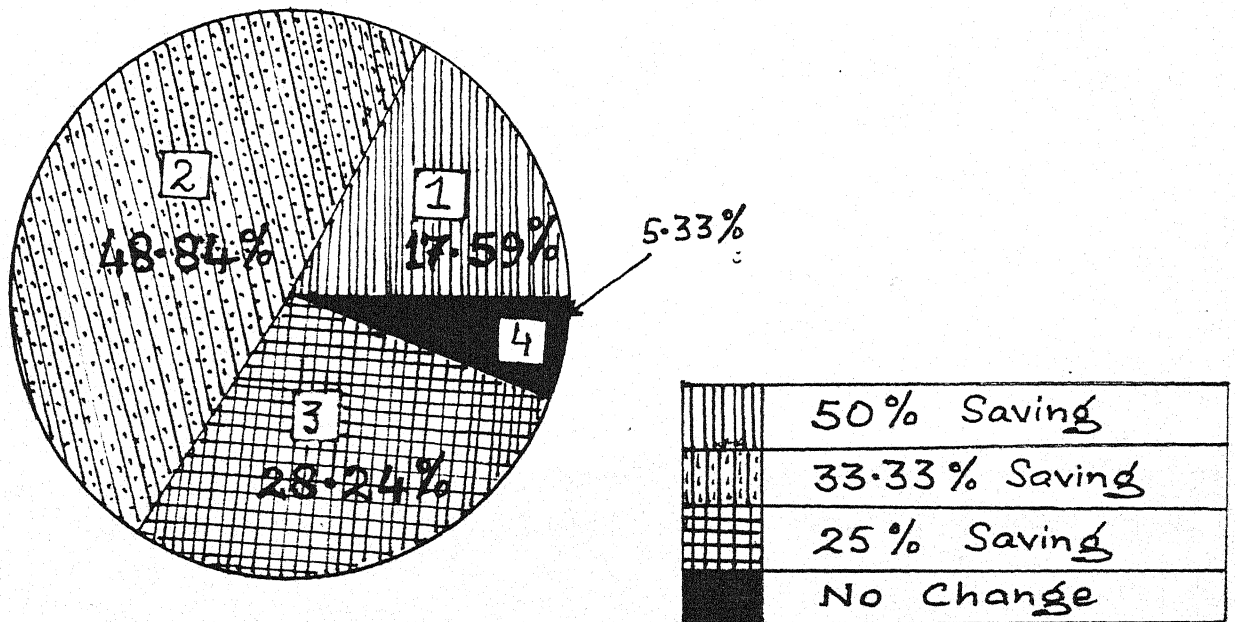
■ Safer Than Traditional chulha



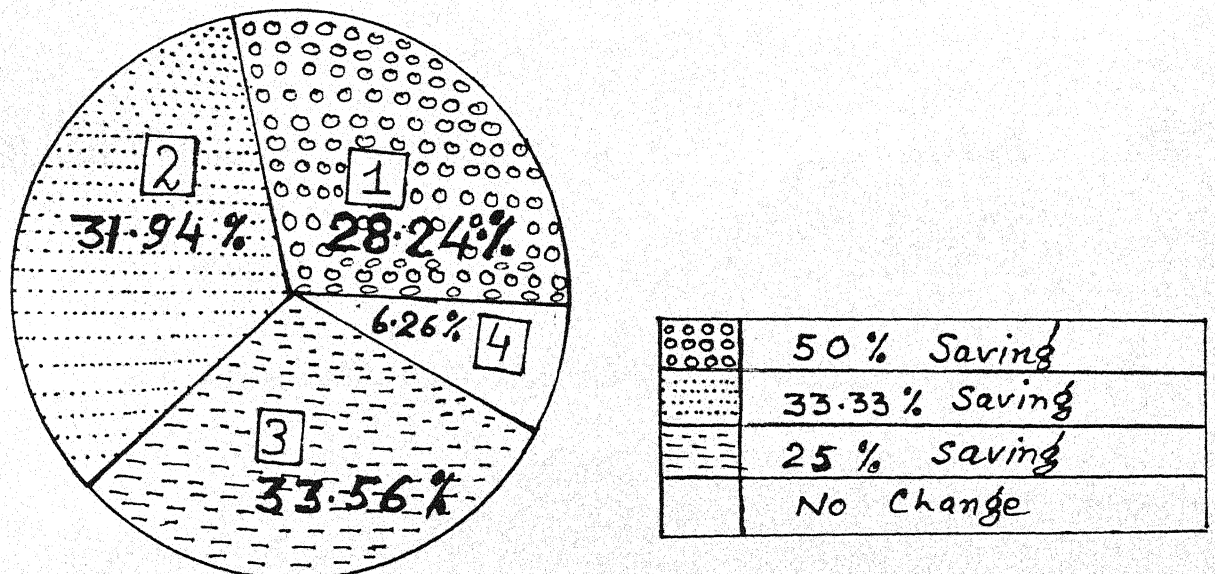


## APPENDIX - XII

Advantage of Improved chulha in terms of fuel saving  
(Percentage of Users reporting fuel saving)



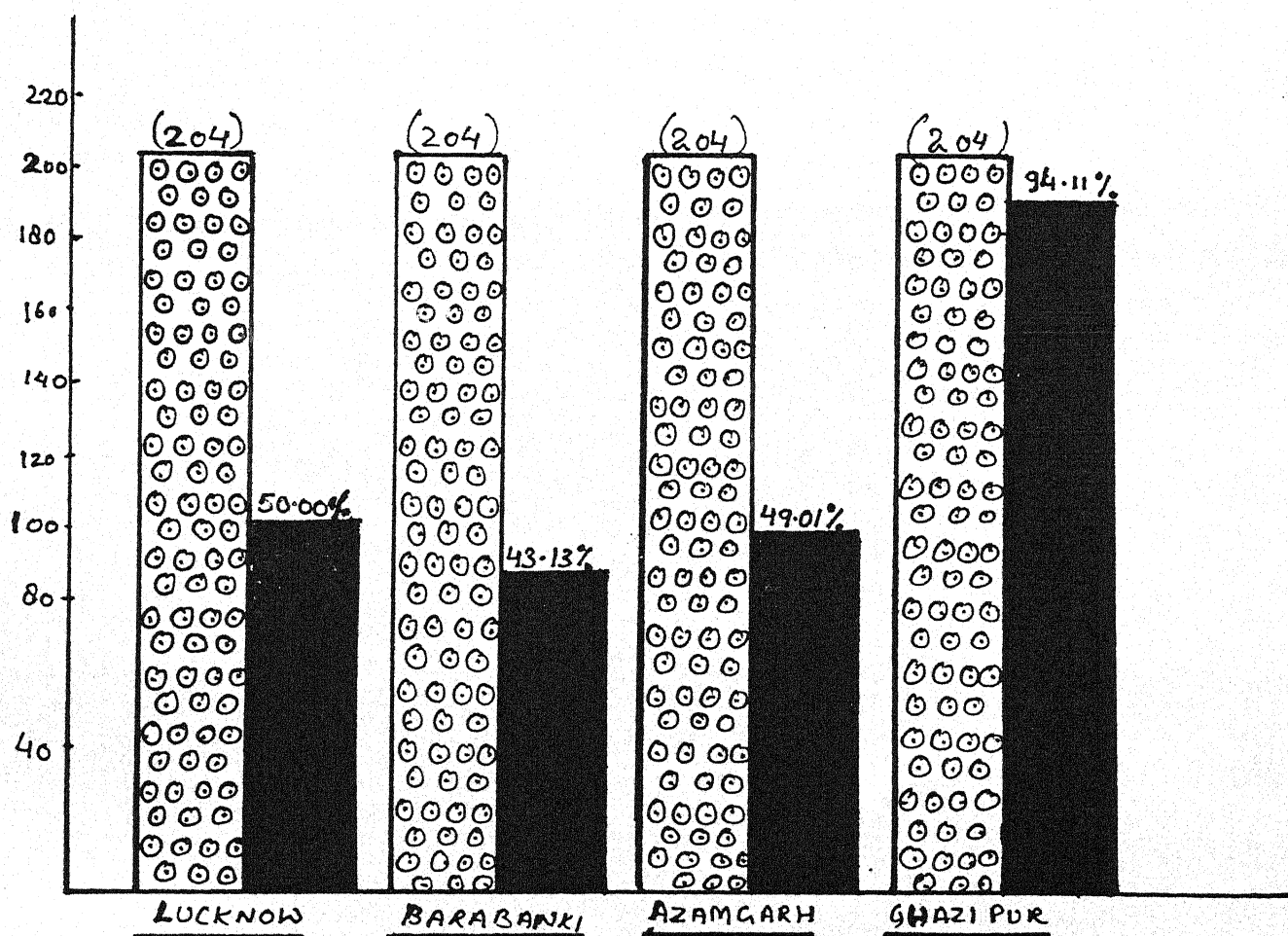
Advantage of Improved chulha in terms of Time-Saving  
(Percentage of users reporting time saving)







APPENDIX - XIII

*Districtwise Distribution of chulhas Installed and Instructions given to the users*



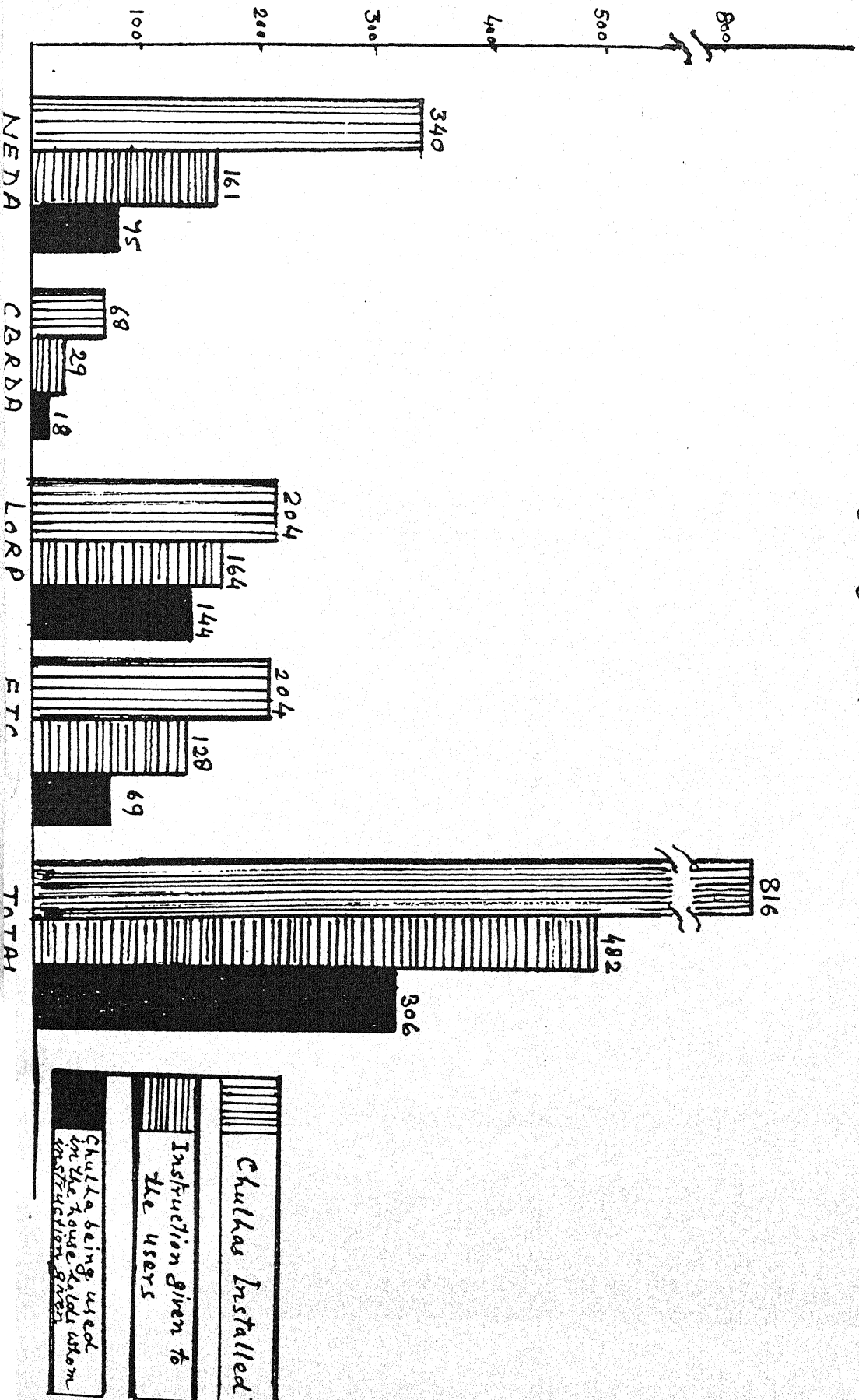
	Total chulhas installed
	Instructions given to users





APPENDIX-XIV

Instruction given to the users and the working Chullas  
(Agencywise)





APPENDIX - XV

Households Interested To Instal Improved Chulha  
(Users of Traditional Chulha)

